the OIL AND GAS JOURNAL

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pays off
in drilling

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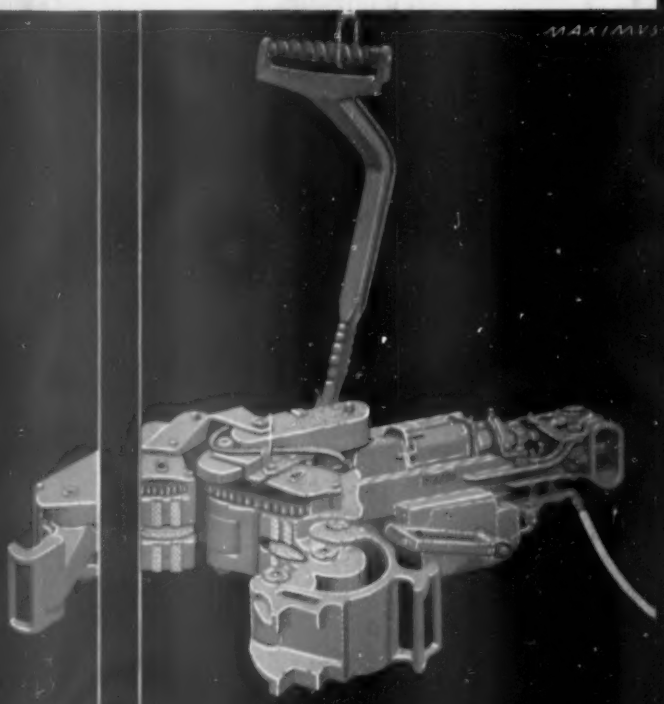

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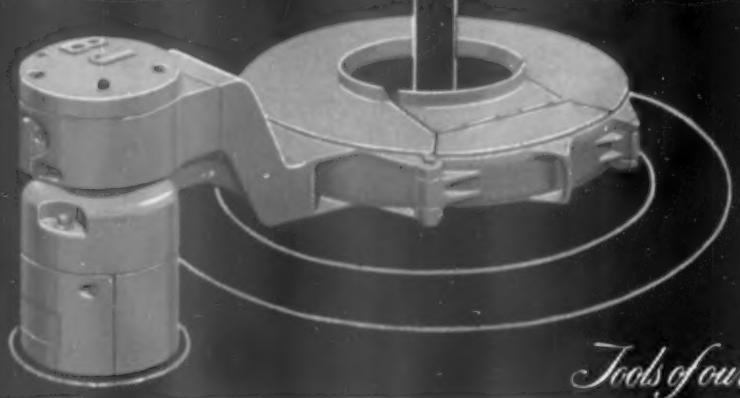

Tools of our Trade No. 4

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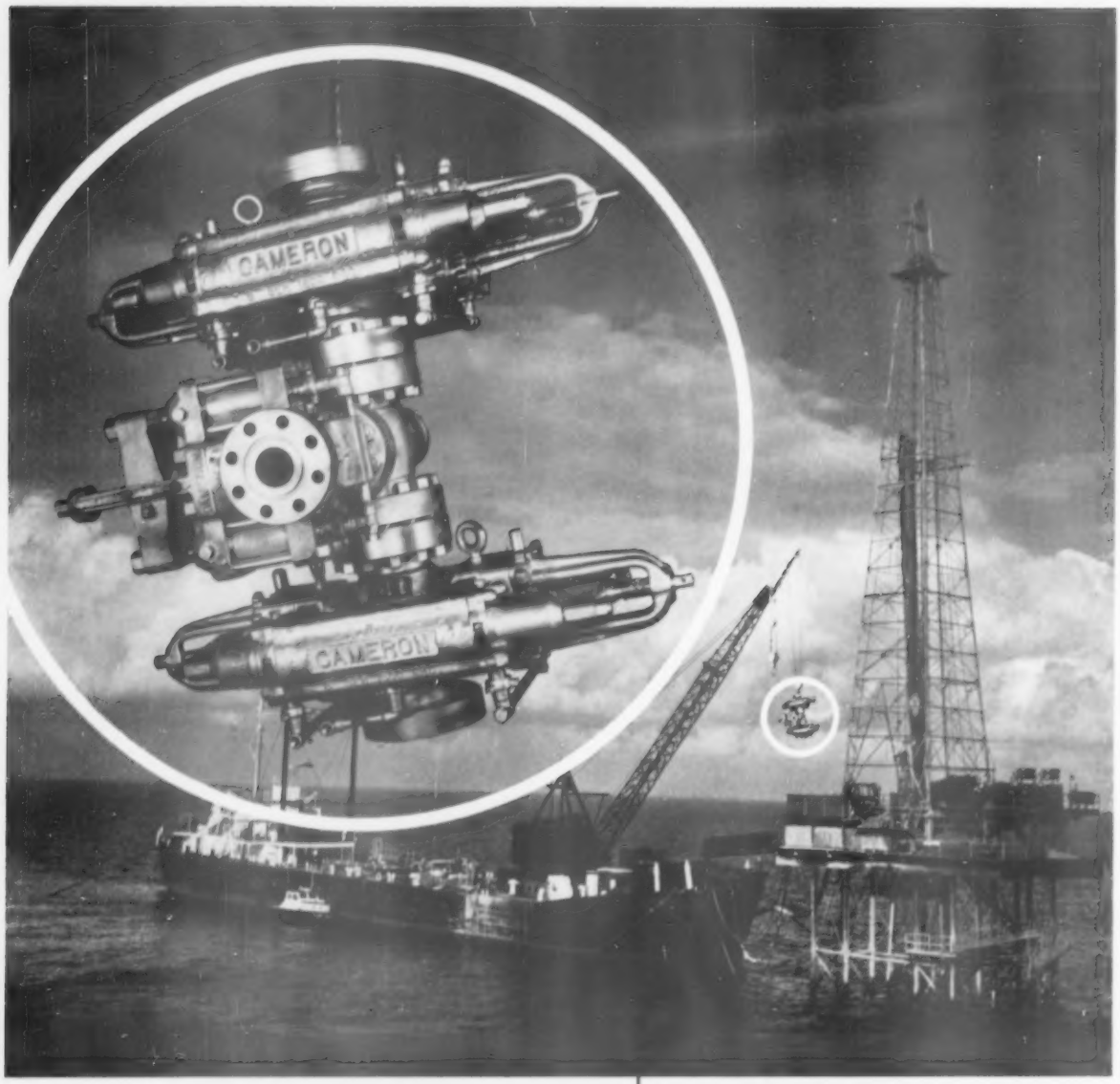

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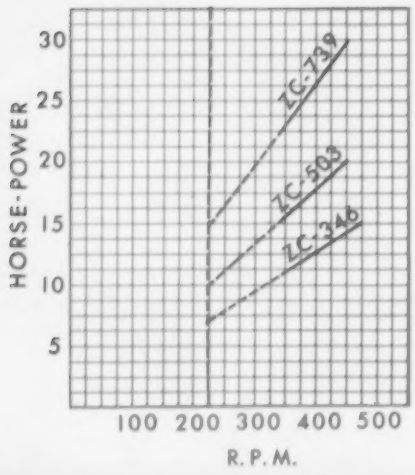
1. NEW DRILLING AREA . . . Cambrian Trend in West Central Texas is attracting operators because of prolific pay sands and relatively inexpensive digging. Economics are favorable with high ratio of profit to investment and short-term payout. Principal problem is lost circulation in the Strawn reefs and in Ellenburger and Cambrian dolomites.

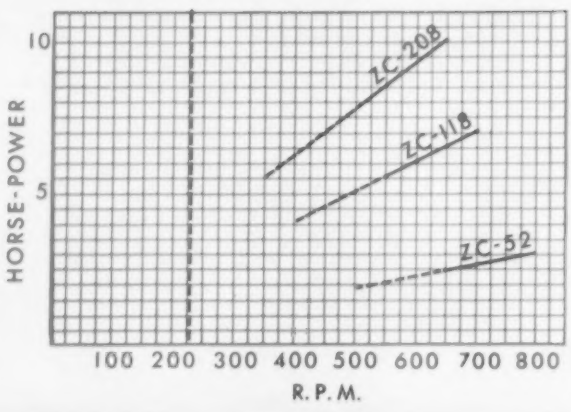
2. PIPELINE PROTECTION . . . Field experiences with a new oil-soluble antirust agent show that (1) a products pipeline can be protected from internal corrosion indefinitely; (2) use of the agent will maintain a high C factor without scraping; (3) addition of agent to the line provides for protection and subsequent distribution facilities; (4) with proper precautions rust lifting on addition of the agent into a badly corroded line can be prevented.

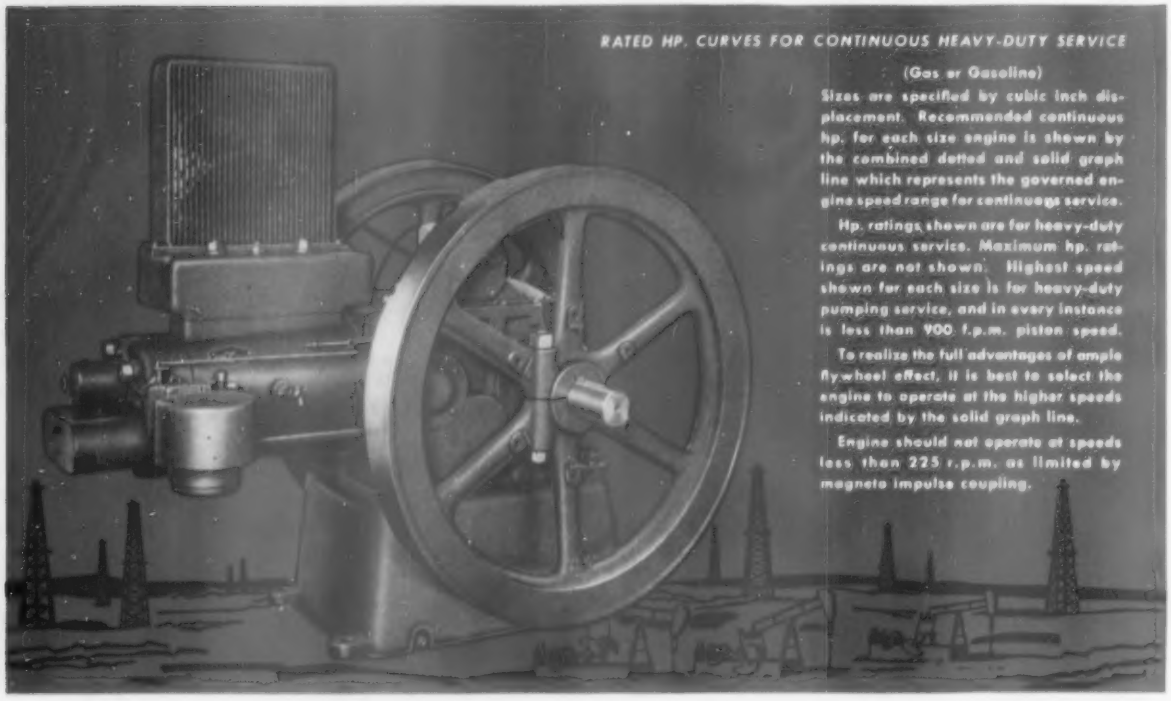
3. BETTER THREAD COMPOUND . . . Field evaluation of high-pressure silicone-containing thread compound on tubing, casing, and subsurface controls has shown the compound is readily applicable and adheres well to the thread. It is an excellent antigall compound and a good sealer. No joint leakage has developed in service. Durability of the compound may exceed that of others.

4. NO WATER POLLUTION . . . At Imperial's Sarnia refinery, contaminants are removed at the source wherever possible and biological oxidation is used to remove residual phenolic materials and other reducing compounds. Spent caustic soda and sour condensates are neutralized by flue gas. Solid material is dewatered and deoiled and burned in a furnace specially designed for the purpose.

5. INEXPENSIVE COOLING WATER . . . A fully automatic installation for treating cooling water requires only weekly tests for supervising treatment and reduces costs of chemicals 50 to 75 per cent. Only two chemicals are used. Sulfur is burned in a special burner at controlled pH. A corrosion inhibitor also serves as an algaecide and bactericide.



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Sizes are specified by cubic inch displacement. Recommended continuous hp. for each size engine is shown by the combined dotted and solid graph line which represents the governed engine speed range for continuous service.
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Figs. 1 and 2 are representative of results obtained in a test conducted by a major oil company in an area where an abnormal number of sludge complaints in domestic heating systems were received.

Fig. 1 shows a typical filter element as removed from one of the heating units after running on untreated fuel. Fig. 2 shows an element at the end of a 90-day test period in which the same fuel plus Fuel Oil Additive No. 2 had been used in the system.

This, and other findings in the test, indicated that Du Pont Fuel Oil Additive No. 2 acts as an active sludge dispersant in concentrations of 20 lbs./1000 barrels and that its use in dirty fuel oil systems is generally beneficial.

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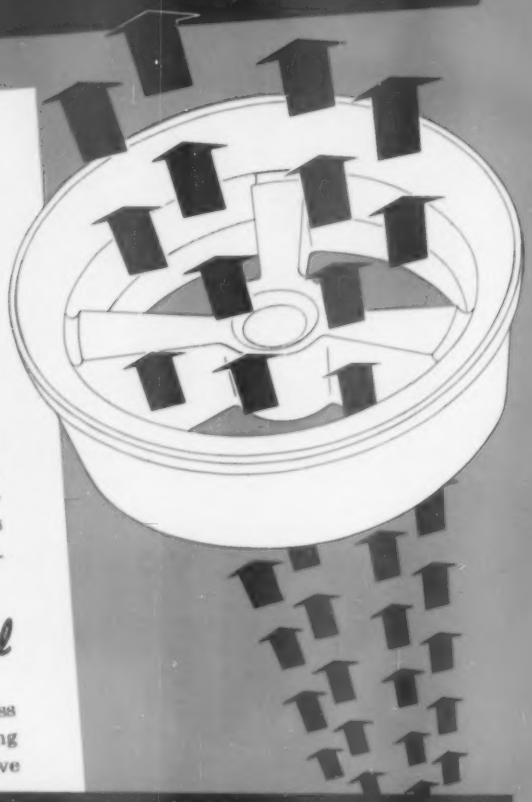

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Because . . . of the many makes of slush pump valves and seats on the market today and because adequate fluid passage areas are so essential to smooth pump operations, we made comparisons between "Oilwell" and six other popular brands. NOT ONE equalled the "Oilwell" valve in flow area through the seat.

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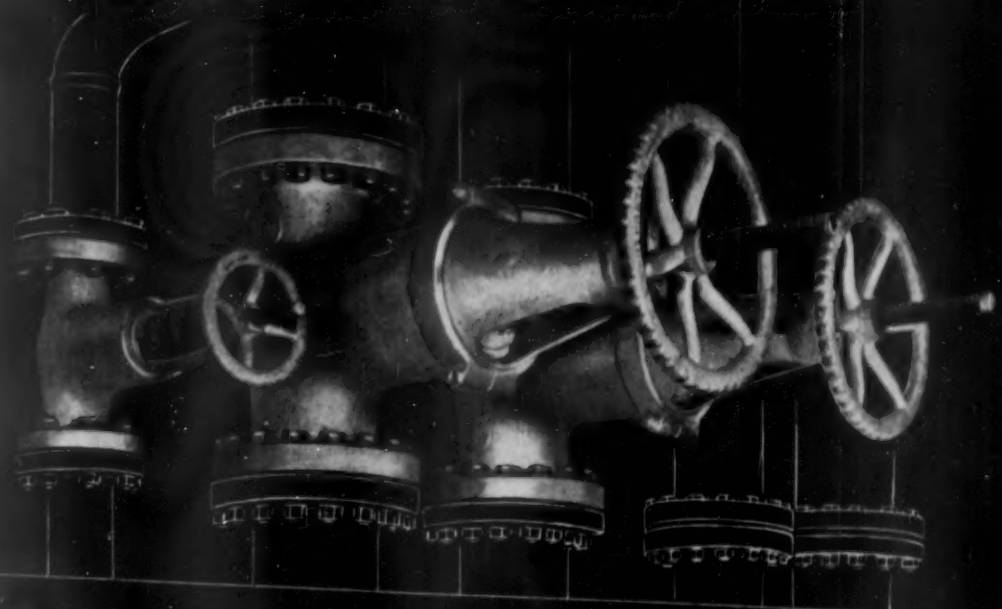

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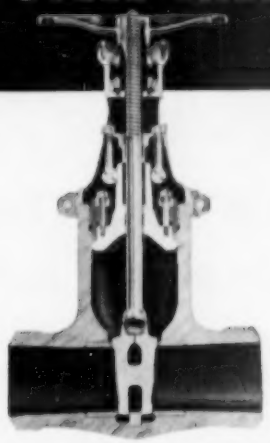
Better because ... **They have no bonnet flanges, bonnet bolts, or bonnet welds. Ideal for high-pressure, high-temperature steam service and corresponding boiler feed service, Walworth Pressure-Seal Cast Steel Valves weigh less, and take up less space than the flanged bonnet type of valves used for similar services.**



Cross section of 8-inch Series 900 Walworth Pressure-Seal Cast Steel Gate Valve. Pressure-Seal Globe, Check, Angle, and Non-Return Valves are also available in Series 600, 900, 1500 and 2500 in a wide range of sizes.

These are a few of the important advantages made possible by the design of Walworth *Pressure-Seal* Cast Steel Valves. Internal line pressure is utilized within the bonnet to maintain a tight, leakproof, body-to-bonnet connection under all normal operating conditions. The higher the pressure, the tighter the seal.

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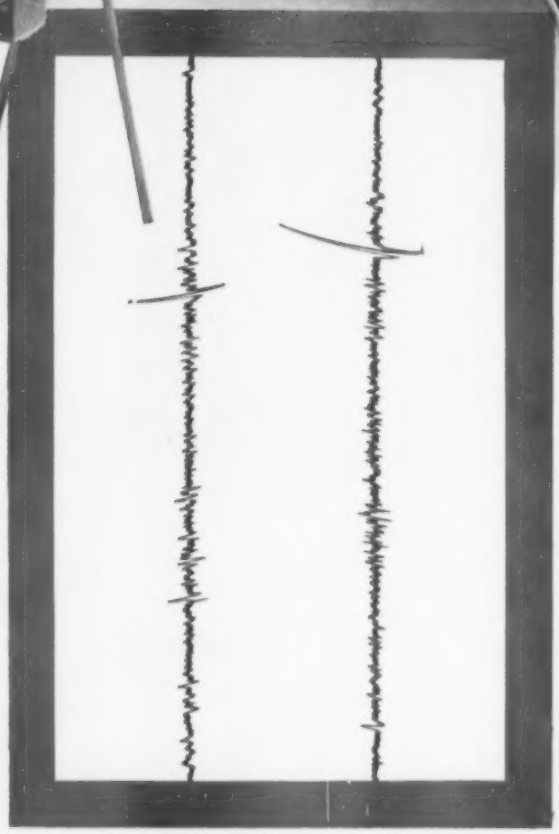

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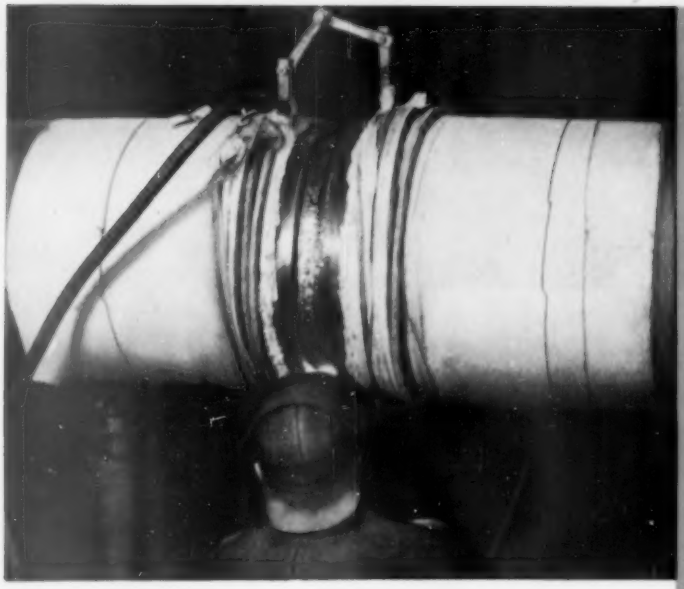

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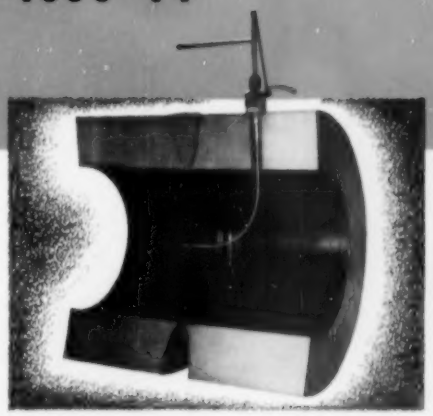
for steam at 2050 PSI and 1050° F!



A test piece of 4" wall pipe cut apart to show the quality of the weld. Also illustrated is the method used to introduce a radium capsule into the center of a completed assembly for radiographic examination of the weld.

You can be confident of the piping fabricated in Grinnell shops, because Grinnell Research predetermines materials and methods, then checks results to insure that specifications are met exactly.

An example of the thoroughness of Grinnell Research is the preparatory work which was done to insure the performance of the piping shown above. This sub-assembly is being fabricated from 4" wall pipe forged from 2¼% chrome, 1% moly steel. To withstand the high pressure and temperature of this installation, Grinnell Research specified the fabricating and welding procedures to be used. This included the time and temperature cycles for preheating and stress relieving, and the correct type of electrodes.

Preliminary test welds on sample pipe were made. These were then cut apart and analyzed to check microstructure and strength of the weld, which had to have the same properties as the pipe itself.

Taking photomicrograph of specimen of a test weld.

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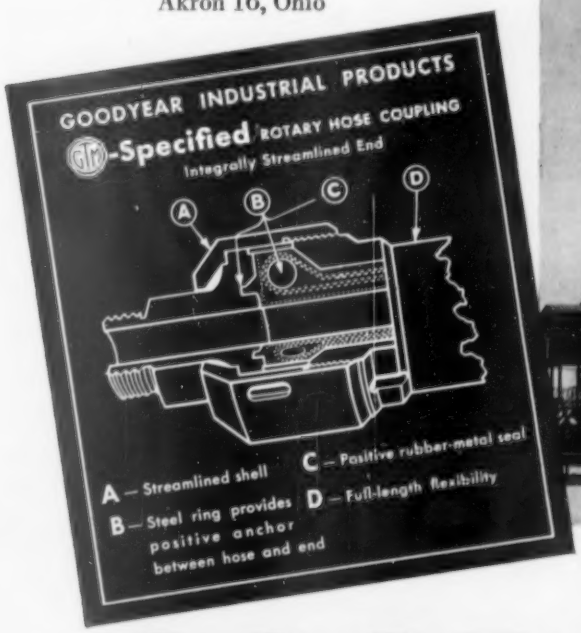

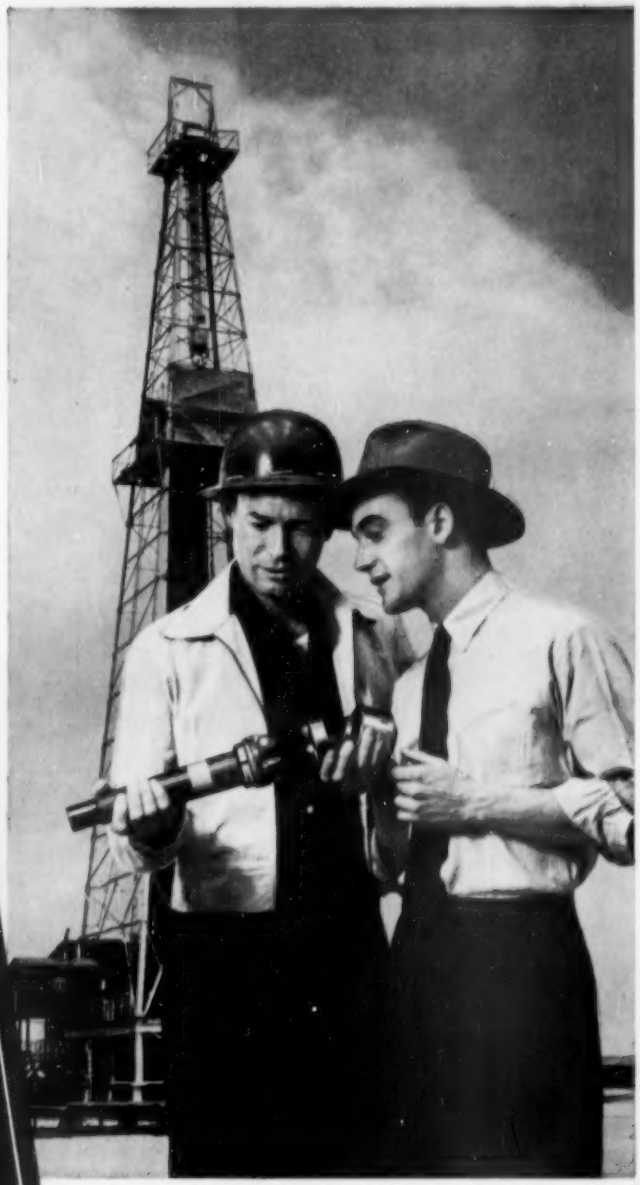

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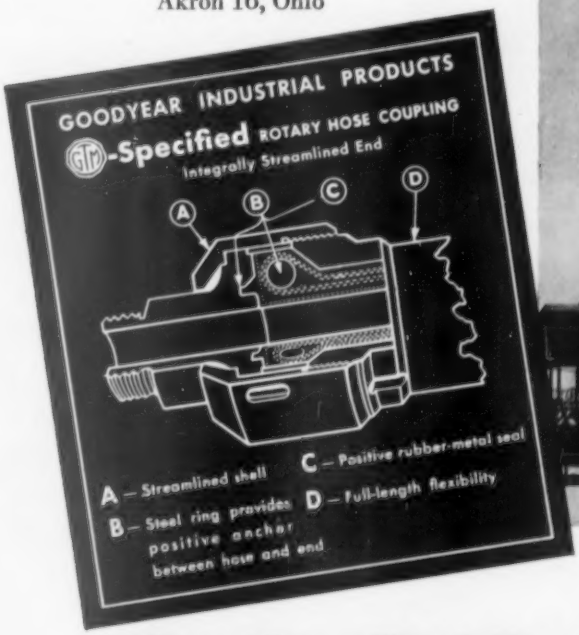

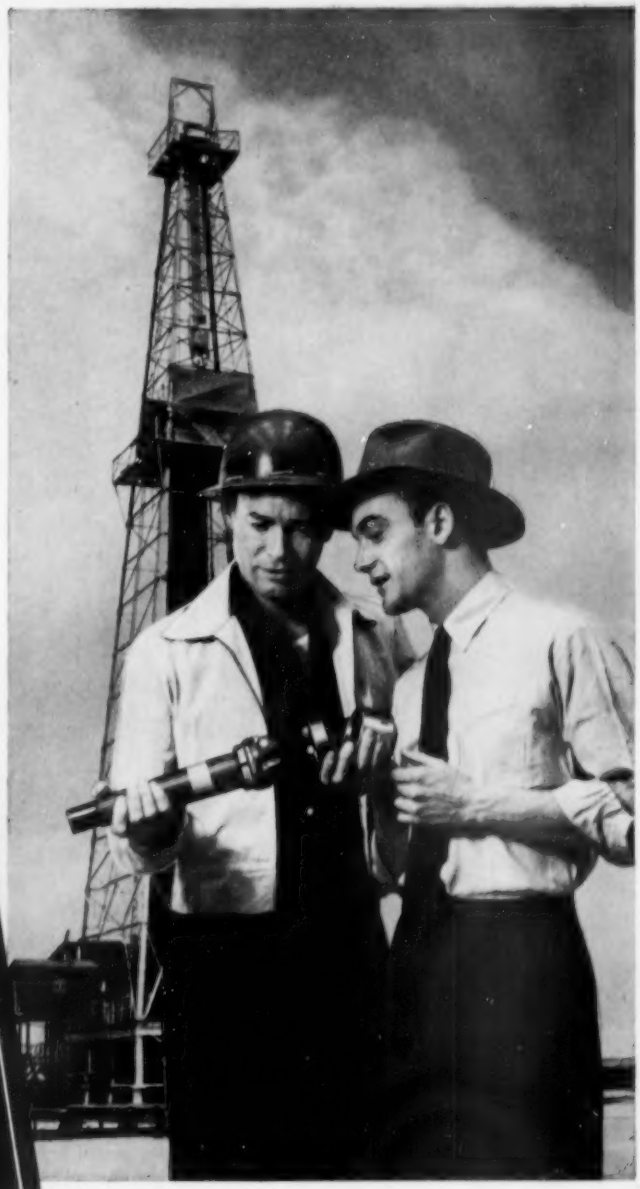

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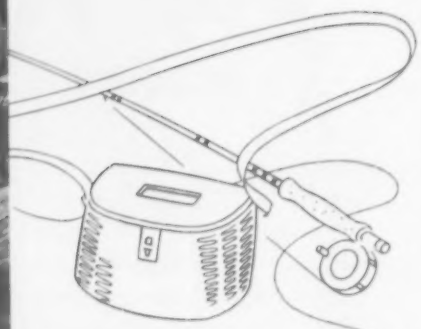

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Many a successful man works hard at being successful . . . only to find he has no time for what success is supposed to bring: The thrill of going places; the enjoyment of friends, of sports, of pleasure.

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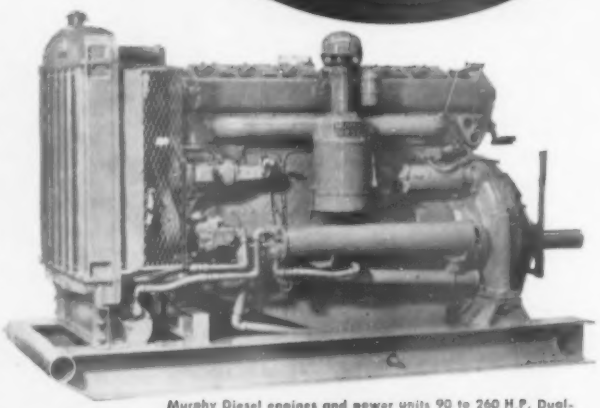


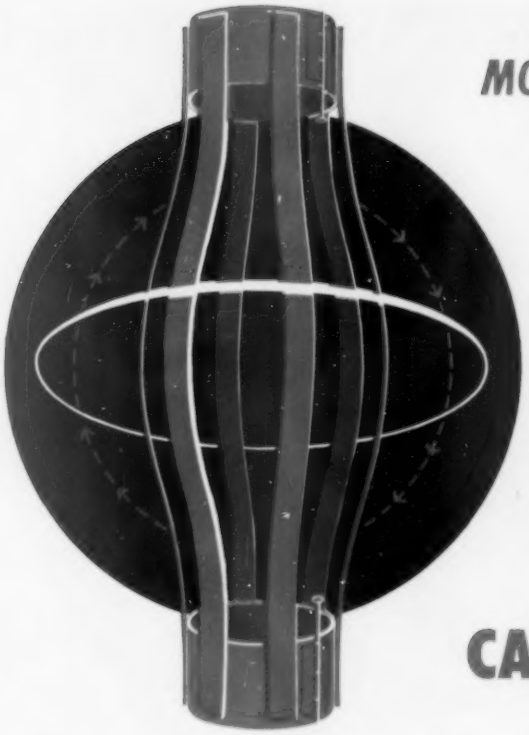
Murphy Diesel engines and power units 90 to 260 H.P. Dual-Fuel engines, 135 to 215 H.P. Generator Sets 60 to 154 K.W.

285

MURPHY DIESEL

SEE YOUR MURPHY DIESEL DEALER, TODAY—

ALBUQUERQUE, NEW MEXICO, Lively Equipment Company; BUTTE, MONTANA, Hall-Perry Machinery Company; CORPUS CHRISTI, TEXAS, Houston Engine & Pump Company; DALLAS, TEXAS, Conley-Lott-Nichols Machinery Co.; DENVER, COLORADO, Power Equipment Company; EDMONTON, ALBERTA, CANADA, Northern Engine & Equipment Co., Ltd.; GREAT BEND, KANSAS, Manufacturers Dist. Co.; GREAT FALLS, MONTANA, Hall-Perry Machinery Company; HOUSTON, TEXAS, Houston Engine & Pump Co., Inc.; JACKSON, MICHIGAN, Utility & Industrial Supply Co.; LOS ANGELES, CALIFORNIA, Industrial Engine Service; LUBBOCK, TEXAS, Conley-Lott-Nichols Machinery Co.; SAN ANTONIO, TEXAS, The Roy Klossner Company; BAKERSFIELD, CALIFORNIA, Glenn Rose Engine Service; ODESSA, TEXAS, Conley-Lott-Nichols Machinery Co.; LONGVIEW, TEXAS, Nichols Machinery Co. TULSA, OKLAHOMA, SALES, PARTS AND SERVICE.



MORE PROTECTION ALL AROUND,

ALL THE WAY DOWN

HALLIBURTON'S S-3 CASING CENTRALIZER

Stronger springs of special steel, as tough as armor-plate, put a rugged guard on casing for more all around protection—*all the way down hole*. The important difference in strength and the exclusive design of the Halliburton S-3 Casing Centralizer combine to deliver the most in cementing efficiency and casing protection.

Extreme tests proved that more positive centering force is built right into the heavier springs. Completely deflected 25 times under tremendous pressures, the S-3 lost as little as 3.94% in bowed height—considerably less than ordinary centralizers. Field use confirmed that each spring does more, making it possible to use fewer centralizers and still get more positive centering force. That means extra advantages in freer circulation in the annulus, faster installation and overall economy.

The S-3 makes it possible to run casing through the most tortuous hole conditions and be positive that *springs will never touch casing*. As the special springs deflect, they carry the centering load to points on the sturdy end bands. Springs are lap welded to these hinge-type end bands to give maximum protection against breakage.

The Halliburton S-3 Casing Centralizer provides so many exclusive advantages—including less drag on rotating casing than any other centralizer—that it is the most valuable low cost investment you can make. Depend on more positive centering force from the S-3 to hold casing for a strong, uniform cementing job. And depend on the S-3 to do the job with greater safety.

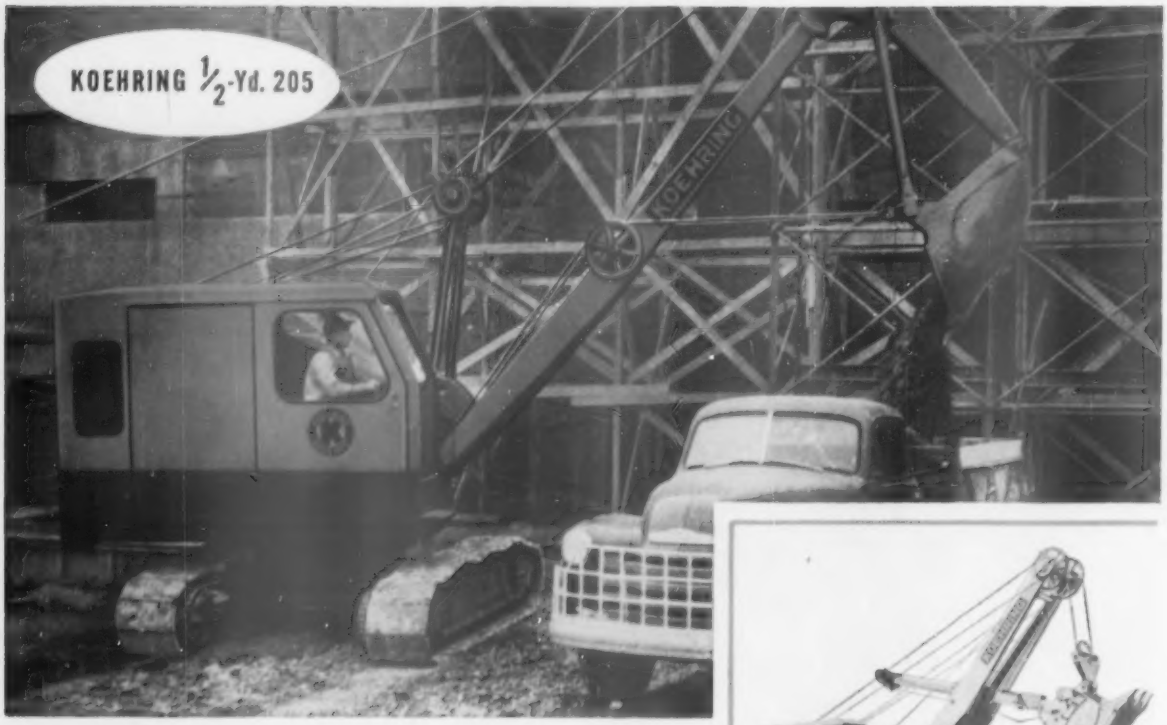
Get your free copy of the new S-3 booklet with valuable spacing guide charts for all casing sizes and hole deviation conditions. Call your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

For slim hole drilling . . . remember the positive efficiency of the Halliburton Slim Hole Centralizer. Designed especially for liners run in casing or specific slim hole sizes, this rugged centralizer uses heavy, inflexible springs for maximum centering force.

HALLIBURTON

CEMENTING EQUIPMENT

THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING!



digs 17¾ feet deep . . . dumps at 10 foot height

With its long, deep reach, Koehring ½-yard 205 hoe digs 17¾ feet below grade . . . has 10-foot clearance height at beginning of dump to load trucks. Maximum cutting width, with side cutters, is 32 inches. During the hoist-and-swing cycle, close-coupled dipper pulls up tight to boom, avoids spillage. Powerful cable crowd, fast line and swing speeds maintain big-yardage production. Heavy-duty, box-section boom and dipper arm resist side-sway in toughest digging. Operators like the 205's ease of operation . . . *you'll* like its EXTRA WORK CAPACITY. Here are some of the heavy-duty advantages you get that increase production with every 205 attachment:

Big 20-inch main drum clutches.

Only 2 major shafts in upper machinery . . . simple, accessible.

Heavy-duty splined shafts . . . carburized, hardened gears.

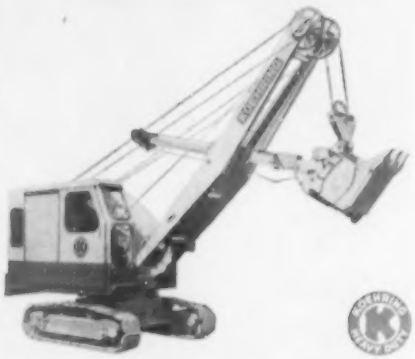
4 hook-rollers, eccentric adjustment.

Automatic crawler traction-brakes.

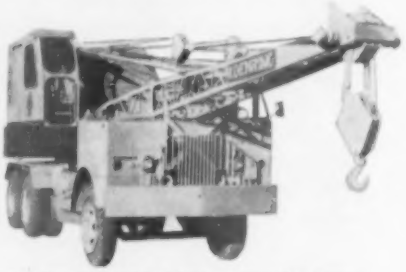
Standard or extra-long crawlers . . . with 16, 20, or 24-inch shoes.

Independent traction . . . optional.

Antifriction power-flow for dig, hoist, swing, travel.



Crawler-mounted 205 brings you: ½-yard dipper capacity as a shovel or hoe . . . ½ to ¾-yard bucket capacity as a clamshell or dragline . . . 10-ton lift crane.



Truck-mounted 205 has 15 tons lift capacity, 25 to 55-ft. boom, plus max. 30-ft. jib. Travels 32½ m.p.h. Converts to all standard excavator, crane attachments.

Get the complete story on this new 205. Ask your Koehring distributor for details, or write for bulletin.

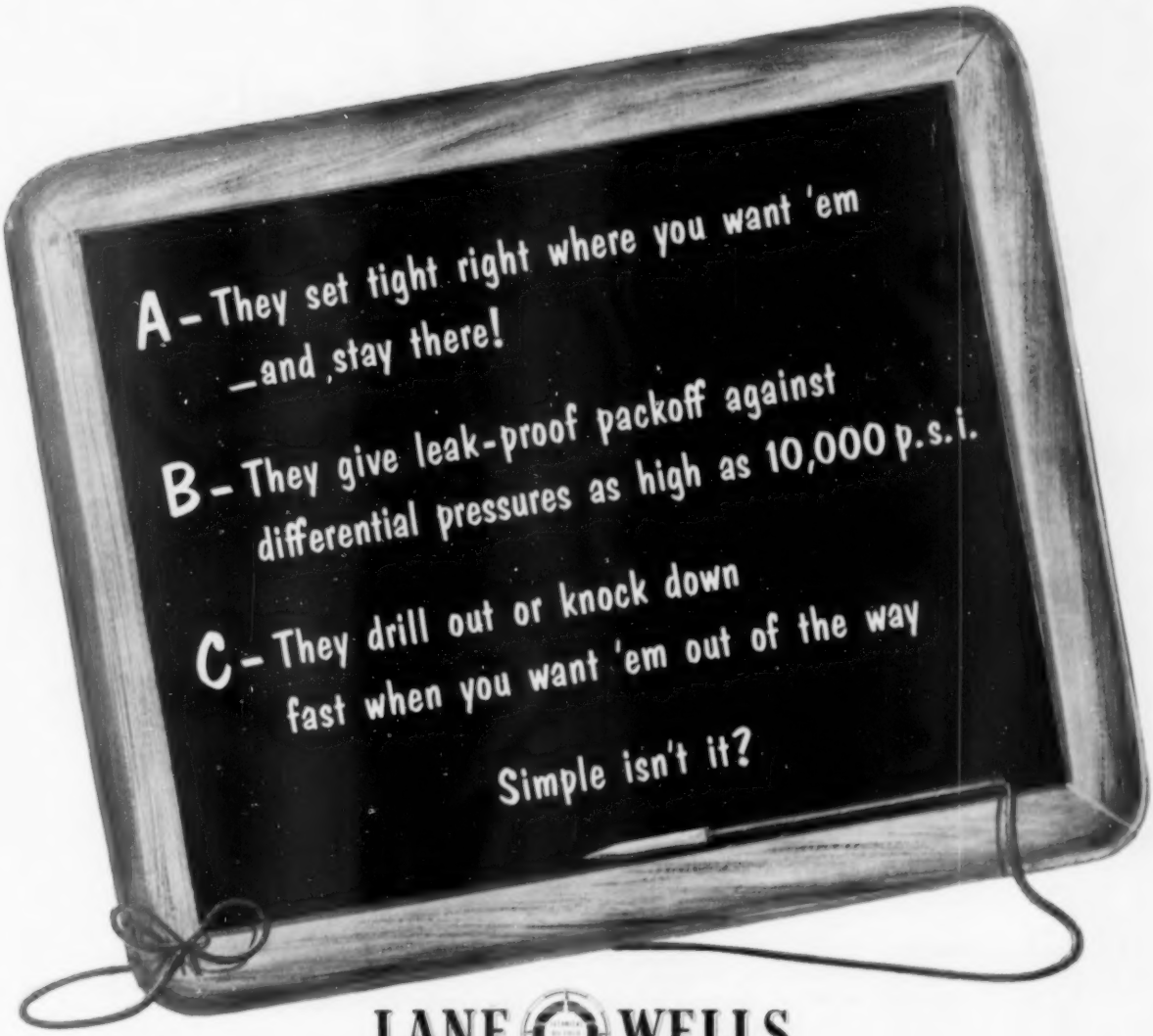
OGJ

To: KOEHRING CO., Milwaukee 16, Wis.
Send us bulletin on the new ½-yard, 15-ton 205.

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____

KOEHRING
COMPANY • Milwaukee 16, Wis.
Subsidiaries: PARSONS • KWIK-MIX • JOHNSON
6467

Oil Operators use these Bridging Plugs – *for three reasons*


A – They set tight right where you want 'em
– and stay there!
B – They give leak-proof packoff against
differential pressures as high as 10,000 p.s.i.
C – They drill out or knock down
fast when you want 'em out of the way
Simple isn't it?

LANE WELLS COMPANY

Wireline Drillable Bridging Plugs

MAGNESIUM — Magnesium Plug is rated to hold against differential pressures up to 6,000 p. s. i., and drills out in 1 to 3 hours.

CAST IRON — Cast Iron Plug is rated to 10,000 p.s.i., outlasts the casing in permanent installations, yet drills out in 4 to 6 hours.

Tomorrow's Tools – Today!

AU-707

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

FAMOUS LAST WORDS:

Let's face it—they won't send out advance warning notices of atom-bomb attacks. They just sneak over and let go when we're least expecting it—without even so much as a declaration of war. The emergency may be an atom bomb or it may be a fire, a flood, a hurricane. It's only good business to be ready for it—whatever it is. Take these precautions TODAY:

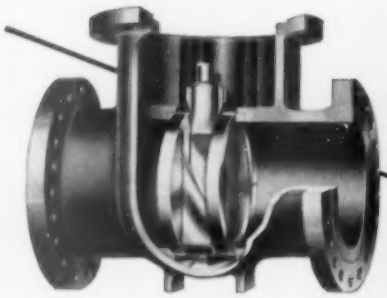
- ☐ **Enlist the help** of your local Civil Defense Director.
- ☐ **Check contents** and locations of first-aid kits.
- ☐ **Send staff** to Red Cross courses. They may save your life.
- ☐ **Promote preparedness** in your community. Your local CD Director can show you how.

Set the standard of preparedness in your plant city—check off these four simple points NOW.

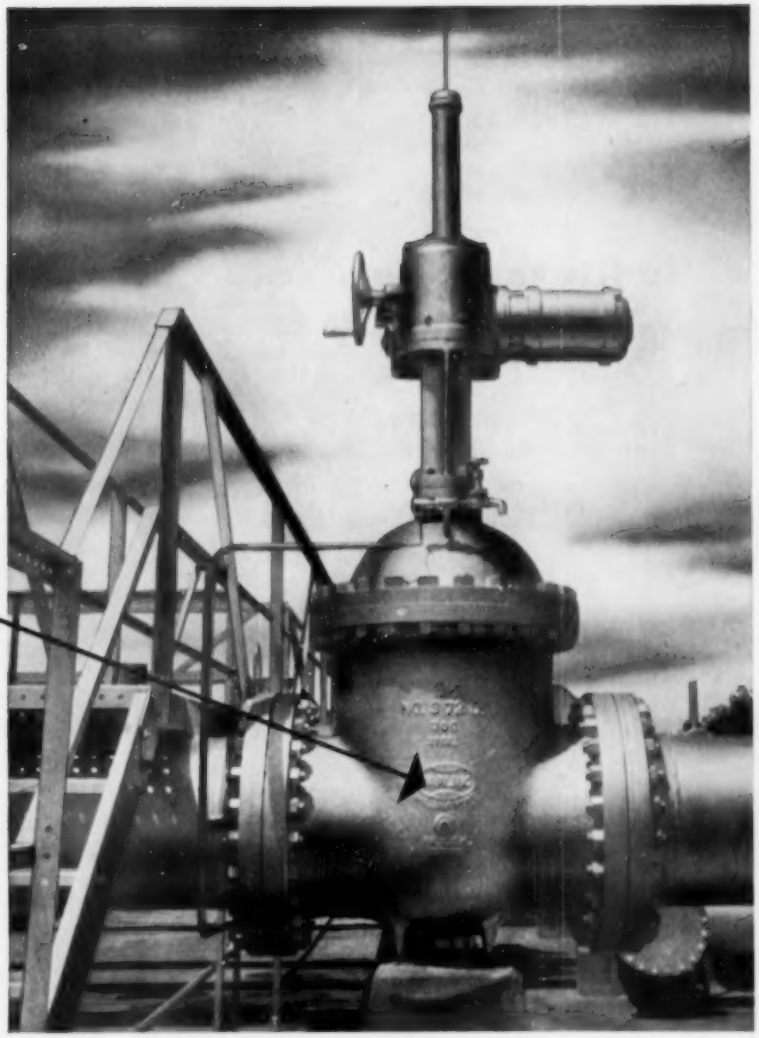
THE OIL AND GAS JOURNAL

TULSA 1, OKLAHOMA

LOOK INSIDE



for dollars to be saved!



Darling 24", Series 300, motor-operated gate valve, with fully revolving double disc feature, at pipe line terminal of oil pumping station.

SURE! Other things being equal, it's definitely the inside of a gate valve that really tells the story. That's why we show and stress the importance to you of Darling's *fully revolving double disc, parallel seat principle!*

Simple construction, interchangeable no-pocket discs . . . yes . . . but that's only the start. This principle assures uniform distribution of disc-and-seat wear . . . coupled with Darling's unique wedging feature it once and for all licks the problem of faulty closure due to valve body distortion . . . and greatly eases operation even under the most adverse conditions.

That's why oil and gas men everywhere have come to count on Darling gate valves for surer performance, longer life and less down time. It pays. We'll gladly give you *all* the facts on Darling valves for your particular operations. Just ask.

DARLING VALVES

DARLING VALVE & MANUFACTURING CO.
Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ont.

He fits the pipes that cross a country...

The minute oil gets above ground — it starts to go places. From the field to the refinery. From the refinery to the distribution center. From the distribution center to the consumer. *Wherever* oil goes, pipes usually play an important part. Big pipes... little pipes... short lines... cross country lines. That's where the pipefitter comes in — he's got to tend them. His skill is needed to keep oil moving, so that oil can keep America moving.

The Texas Company

TEXACO

PIPE LINE PROGRESS

Dope gang preparing a string of A. O. Smith 26-inch welded steel line pipe for lowering in on the West Texas Gulf Pipe Line.

Biggest Inch to carry 381,000 bbl. per day from Permian Basin area

The West Texas Gulf Pipe Line, completed last February, is the largest single carrier of crude oil in this country. It has 465 miles of 26-inch pipe which extends from Colorado City in west Texas to Lucas, just outside Beaumont.

Present capacity of 301,000 barrels per day is being increased to 381,000 by the addition of intermediate pumping stations. Ultimately, capacity can be increased further to an estimated 440,000 barrels per day.

Crude oil from the Permian Basin area, containing more than 20% of the nation's oil reserves, is delivered to the Beaumont area and, through a 20-inch branch of 112 miles, to Longview, Texas, where it connects with other pipe lines serving Great Lakes and Ohio River valley refineries.

A considerable mileage of the 26-inch line is of A. O. Smith welded steel line pipe produced in Milwaukee and Houston. We are proud to have contributed to the construction of this, the Biggest Inch, as we have also to virtually every important petroleum products pipe line in the world.

A. O. Smith Line Pipe is available in a complete range of sizes and wall thicknesses, from 8⅝-in. to 36-in. diameters.

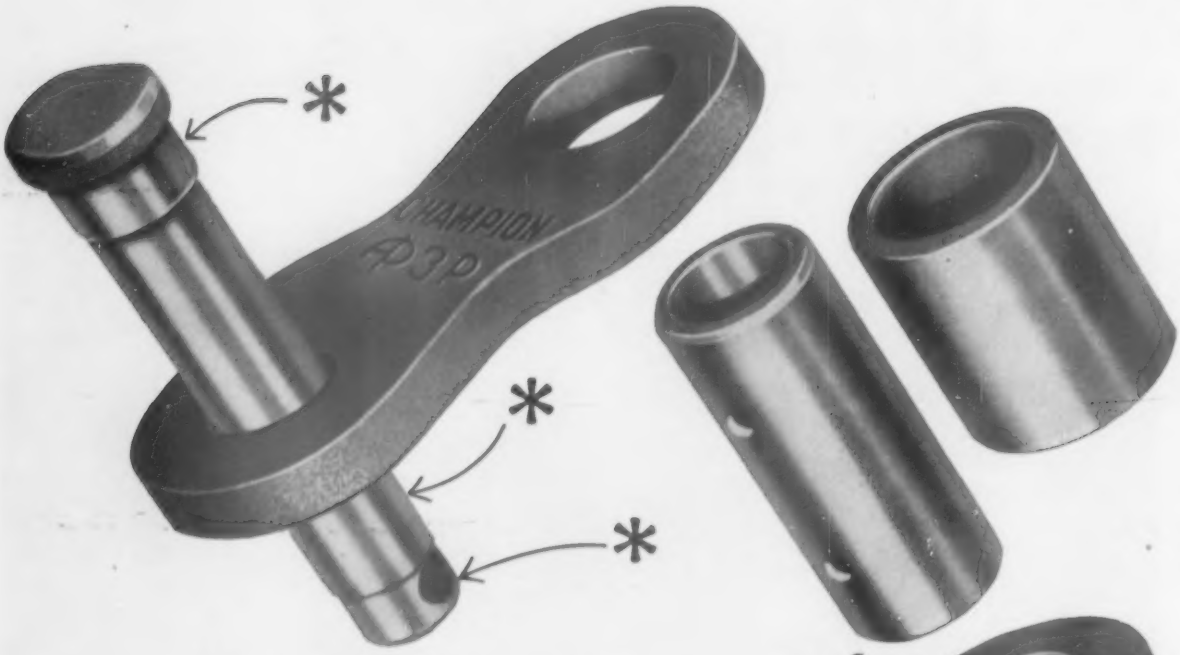
FIRSTS by A.O.Smith: Welded line pipe • Internally expanded pipe • Light-wall large-diameter pipe • World's largest producer of large-diameter welded steel pipe.

The A.O.Smith Casing Mill is operating at capacity to supply vitally needed casing for the Oil and Gas Industry.

A.O.Smith
CORPORATION
LINE PIPE • CASING

Chicago 4 • Dallas 2 • Denver 2 • Houston 2
Los Angeles 22 • Midland 5, Texas • New Orleans 12
New York 17 • Pittsburgh 19 • San Francisco 4
Seattle 1 • Tulsa 3 • Washington 6, D.C.
International Division: Milwaukee 1

DEPENDABILITY THROUGH RESEARCH AND ENGINEERING



No special glasses needed for our 3D*

You can easily see the advantages of the 3-D ...3-Diameter Pin...used in Rex A.P.I. Oil Field Chains. Three individual diameters... *one* under the pin head...*two* on the bushing bearing area...*three* on the cotter end... assure fast, easy field assembly and disassembly. It is necessary only to drive the pin the thickness of a single sidebar. No need for heavy battering with sledge and drift pins. Yet, there is no sacrifice in strength, bearing area or pin life. The Rex 3-D Pin is but one of the many advantages that make Rex A.P.I. Chains "the favorites in the fields." For the complete story, see your supply store or write Chain Belt Company, 4619 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT COMPANY

District Sales Offices and Distributors in all principal cities

Now, for a new high in catalyst utilization!

three new grades of Synthetic Fluid Cracking Catalyst

covering all fluid cracking unit requirements—

for fluid units with

low linear gas velocities
adequate dust disengaging space
excellent cyclone and Cottrell efficiency
low bed density needs

Aerocat® 50/60
(Light)

low apparent bulk density
low average particle size
33% below 30 microns
only 8% above 80 microns

for fluid units with

moderate to high linear gas velocities
adequate catalyst recovery

Aerocat 60/70
(Intermediate)

well-balanced particle size distribution
in 30 to 80 micron range
7% below 30 microns
24% above 80 microns

for fluid units with

high linear gas velocities
moderate disengaging space
limited recovery equipment

Aerocat 75/85
(Narrow)

particle size distribution concentrated
in 30 to 80 micron range
gives best fluidization possible with
narrow cut catalyst
75-85% in 30 to 80 micron range
5-10% below 30 microns
15% above 80 microns

Better catalyst usage, higher fluid cracking efficiency

Based on existing fluid unit needs

To provide refiners a better selection of fluid cracking catalyst grades, we first surveyed the industry to pin-point the type of fluid units operating, and their cracking catalyst requirements.

This study revealed certain basic types of operation. Accordingly, the three new grades of AEROCAT MS catalyst were designed to give optimum catalyst usage under any particular set of conditions.

Offers you better selection for higher cracking efficiency

These new grades of AEROCAT cover the entire range of fluid catalyst requirements. The new grades, representing the widest range available anywhere, will help you select the catalyst best suited to *your* fluid catalytic cracking operation.

You will certainly want to consider these grades in connection with your unit requirements. A data sheet will be mailed on request, or you may call on one of our Technical Representatives.

Aerocat® MS Synthetic Fluid Cracking Catalyst

American Cyanamid Company
REFINERY CHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

CATFORMING *means*

High Octanes...
High Yields...
Low Cost...
Proved Performance

These advantages of Atlantic Catforming are being demonstrated again and again in different commercial installations. We invite you to share in the benefits of Catforming. Please phone, write or wire for our detailed brochure, "CATFORMING." The Atlantic Refining Company, Research and Development Dept., P. O. Box 8138, Philadelphia, Pa.

ATLANTIC *It's the Catalyst that counts*

WITH A KIDDE CO_2 SYSTEM!

Let fire get a foothold, and a going concern is *gone*. Don't risk it. Install a Kidde Automatic CO_2 Fire Extinguishing System, and fire won't stand a chance.

A Kidde System goes into action at the first sign of fire—releases clouds of CO_2 over the blaze, smothers fire almost as soon as it starts. And CO_2 leaves no mess to clean up later. It puts out the fire, then vanishes.

Protect flammable liquids, machinery and electrical equipment with a Kidde System.

And for on-the-spot protection, get Kidde portables. When fire strikes, just aim the horn, pull the trigger, and *swoosh!* No more fire.

Don't wait 'til your business is a cinder pile—Contact Kidde today.

Kidde

The words 'Kidde', 'Lux', 'Lux-O-Matic' 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

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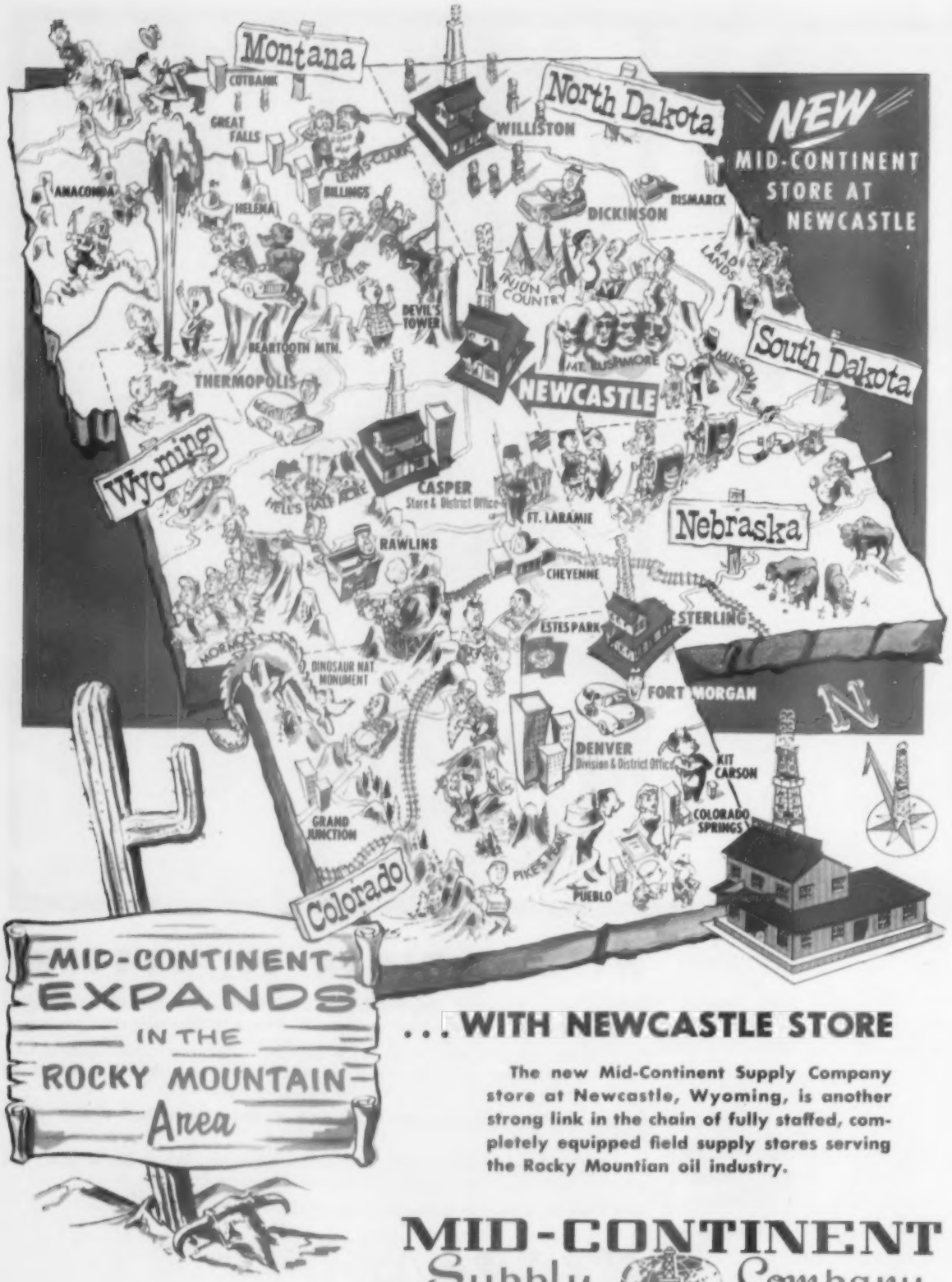


. . . WITH NEWCASTLE STORE

The new Mid-Continent Supply Company store at Newcastle, Wyoming, is another strong link in the chain of fully staffed, completely equipped field supply stores serving the Rocky Mountian oil industry.

MID-CONTINENT
Supply Company

MID-CONTINENT BLDG. • FORT WORTH, TEXAS

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

ANOTHER WAY YOU SAVE WITH FORD *TRIPLE* ECONOMY

ONLY *YOU* CAN PREVENT FOREST FIRES

T-Series Chassis-Cab models fit any special purpose body from 9 to 19 ft., give you up to 3,800 lbs. more payload than other make 6-wheelers.

New Ford Tandem-Axle Big Jobs

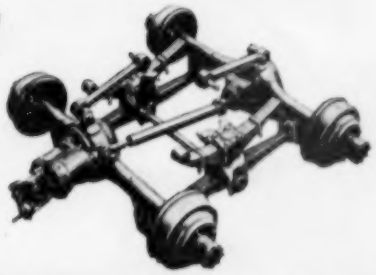
factory-built for low first-cost!

The new Ford T-700 and T-800 BIG JOBS bring famous Ford performance and economy to the extra-heavy-duty field. Ford's mass-production methods keep quality high, first costs low. You get much larger body and payload capacities—up to 95% more on the T-800 than F-800—within legal axle weight limits of most states.

Three new engines up to 170 h.p.—Ford's new LOW-FRICTION, overhead-valve V-8 engines give you low piston speeds, up to 50% longer engine life and more gas-saving power. All-new 138-h.p. *Power King* V-8 and 152-h.p. *Cargo King* V-8 for T-700, and 170-h.p. *Cargo King* V-8 for T-800, develop up to 44% more power per cubic inch than other engines in their class.

New *Master-Guide* Power Steering—is standard on the T-800 and on the T-700 (with 152-h.p. engine). Operative at all times, it cuts steering effort as much as 75% and practically eliminates road shock to the steering wheel. New Ford *Driverized* Cab and controls provide comfort and driving ease to help the driver do hard jobs faster, with less effort.

For complete information, see your Ford Dealer, or write: Ford Division, Ford Motor Co., Dept. T-20, Box 658, Dearborn, Mich.



New Ford factory-installed tandem rear axles are the most modern in the industry. Rubber-bushed suspension reduces shock, minimizes lubrication needs. Power divider with 3rd differential equalizes driving power for longer tire life. Lockout feature standard.

SAVE WITH *ALL THREE*

1. Gas-Saving Power! **2.** Driver-Saving Ease!
3. Money-Saving Capacities!
And . . . Ford Trucks last longer, too!

FORD *TRIPLE ECONOMY* **TRUCKS**
MORE TRUCK FOR YOUR MONEY!

All SHELL AND TUBE ...HEAT EXCHANGERS by Vogt

ABOVE: View of new construction at Louisville Refining Company.

BELOW: Some of the many Shell and Tube Exchangers.

Engineered and Licensed by UNIVERSAL OIL PRODUCTS CO.

At LOUISVILLE REFINING CO.'S New CATALYTIC CRACKING PLANT

Premium gasoline production has been boosted 20% from the same amount of oil charged since the Louisville Refining Company's new Catalytic Cracking Plant went on stream.

The new plant uses Vogt Shell and Tube Heat Exchangers exclusively and they make a significant contribution to the efficient and economic operations of this progressively modern refinery.

Vogt Shell and Tube Heat Exchangers are available in many different types, with fixed or removable tube bundles, to meet the special problem and specific operating conditions of each installation. They are constructed from carbon and special steels to meet every temperature, pressure, or vacuum service requirement.

WRITE FOR BULLETIN HE-6

HENRY VOGT MACHINE CO. Louisville 10, Ky. • BRANCH OFFICES: NEW YORK, PHILADELPHIA, CHICAGO, CLEVELAND, ST. LOUIS, DALLAS, CHARLESTON, W. VA.

HOW DRILLERS ARE MAKING WIRE ROPE HISTORY

J&L SpringKore for Rotary Drilling

This line is made around a steel spring, tightly coiled and packed with lubricant.

You can see that SpringKore would be hard to crush, and likely to yield a bonus in ton miles.

You're right on both counts! No other rotary drilling line has ever aroused so much interest or justified so much enthusiasm in the field.

J&L PlastiKore for Cable Tool Drilling

This rope has a plastic core that absorbs no water, acids, caustics, or other destructive substances. It cushions firmly—keeps the rope uniform.

Cable tool drillers like this practical improvement. PlastiKore is a safer rope, and lasts longer.

PlastiKore is an ideal swab line, too. Rotary drillers are using a lot of it.

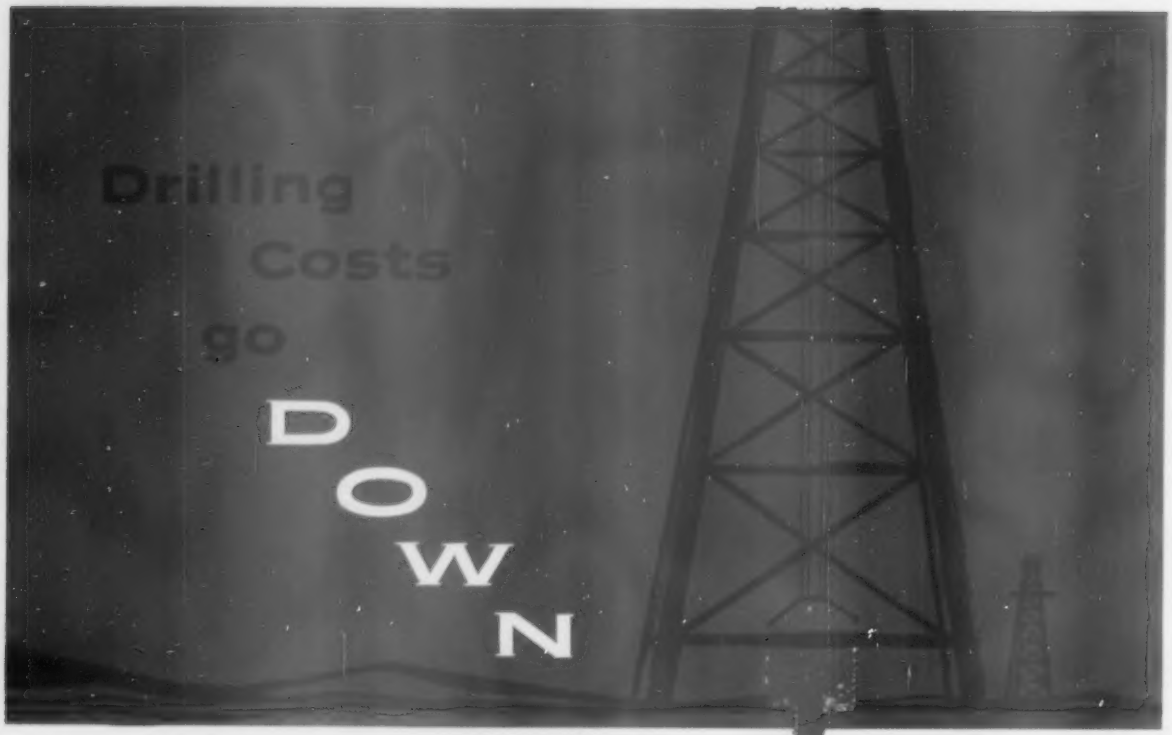
Want to see a sample of SpringKore or PlastiKore? Call that J&L number NOW!

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
SUPPLY DIVISION

Serving The United States and Canada
General Offices: TULSA, OKLAHOMA
J&L Tubular Products and Wire Rope

P·E·S·A
PARTNERS IN PETROLEUM PROGRESS



when Diamond Chromates reduce drill-string corrosion

Take out your pencil and figure how many dollars you'd save if the life of your drill strings were increased, say, four times. Quite a saving, isn't it? And it can be done when DIAMOND chromates and bichromates are used to reduce corrosion. In fact, in some cases, drill-string life has been extended as much as *seven times*.

Can you afford not to investigate such a source of savings? Especially when your DIAMOND representative will be glad to back up the facts with technical service.

And while you're talking to the DIAMOND man, ask him how other DIAMOND chemicals are saving money for oilmen as control agents for drilling mud, inhibiting refinery corrosion, and protecting drill strings in heaving shale areas.

Call or write the Sales Office nearest you, or DIAMOND ALKALI CO., 300 Union Commerce Bldg., Cleveland 14, O.

DIAMOND ALKALI COMPANY
CLEVELAND 14, OHIO

DIAMOND SALES OFFICES:

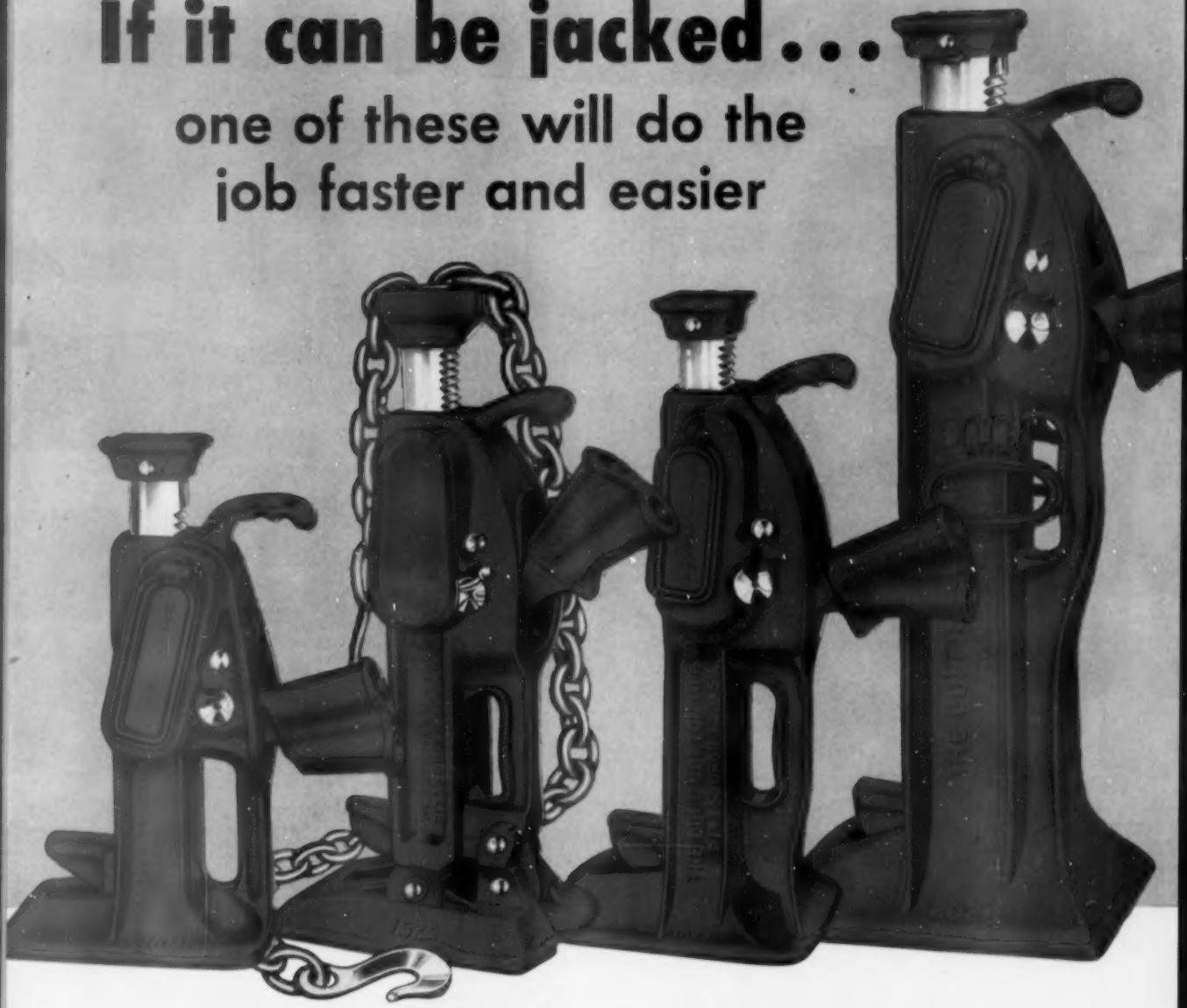
New York,
Philadelphia,
Pittsburgh,
Cleveland,
Chicago,
Cincinnati,
St. Louis,
Memphis,
Houston.

Diamond Chemicals for the Oil Industry

DIAMOND ALKALI CHEMICALS

If it can be jacked . . .

one of these will do the job faster and easier



No. 516-MT	"The Roustabout" No. 1523	No. 1022	No. 2028
5-TON CAPACITY	15-TON CAPACITY	10-TON CAPACITY	20-TON CAPACITY

For Better Service—Duff-Norton maintains complete stocks of jacks of all kinds—ratchet, screw and hydraulic—in *the only jack warehouse in the oil country* at 209 West First Street, Odessa, Texas. Phone 6-3021.

The job will always go faster and easier when you use the correct jack for the job at hand. These rugged, dependable, powerful Duff-Norton jacks are designed and built for years of trouble-free service.

All contain the exclusive, patented, Duff-Norton spring mechanism that assures safe, positive action in lifting or lowering. All have sturdy foot lifts for getting a toe-hold under low set loads.

All are available from your favorite supply store. For complete information on these and many other Duff-Norton Jacks, write the world's oldest and largest manufacturer of lifting jacks for special Oil Field Jack Bulletin, AD 19-B, the Duff-Norton Manufacturing Co., P. O. Box 1889, Pittsburgh 30, Pa. Canadian plant—Toronto 6, Ont.

DUFF-NORTON *Jacks*

"Giving Industry a Lift Since 1883"

9,000 *

furnish the technological **Know How** for advancing and expanding the dynamic multi-billion dollar manufacture-supply-service industry!

HOW THESE HIGHLY TRAINED SPECIALISTS BENEFIT THE GREAT OIL INDUSTRY...

TO KEEP ahead of the requirements of the gigantic and fast growing oil industry, top managements of the companies serving it have taken the long range view in providing engineering talent that anticipates and meets the demands of unprecedented growth.

Few machines, even in this machine age, have to operate regularly under such a combination of great stresses, high temperatures, abrasive and corrosive action as do the machines in the petroleum industry. To meet these extreme conditions, scientists, engineers and technologists are regularly producing miracles of mechanics.

Member companies of the Petroleum Equipment Suppliers Association regularly apply practically every branch of scientific knowledge to the solving of their customers' problems having to do with drilling, producing, and servicing.

* **The petroleum manufacture-supply-service industry is in the highest bracket of large industries regularly using a very high percentage of specially trained scientists, engineers, and technicians. Based on estimates made from a recent survey, there are over 9,000 divided as follows:**

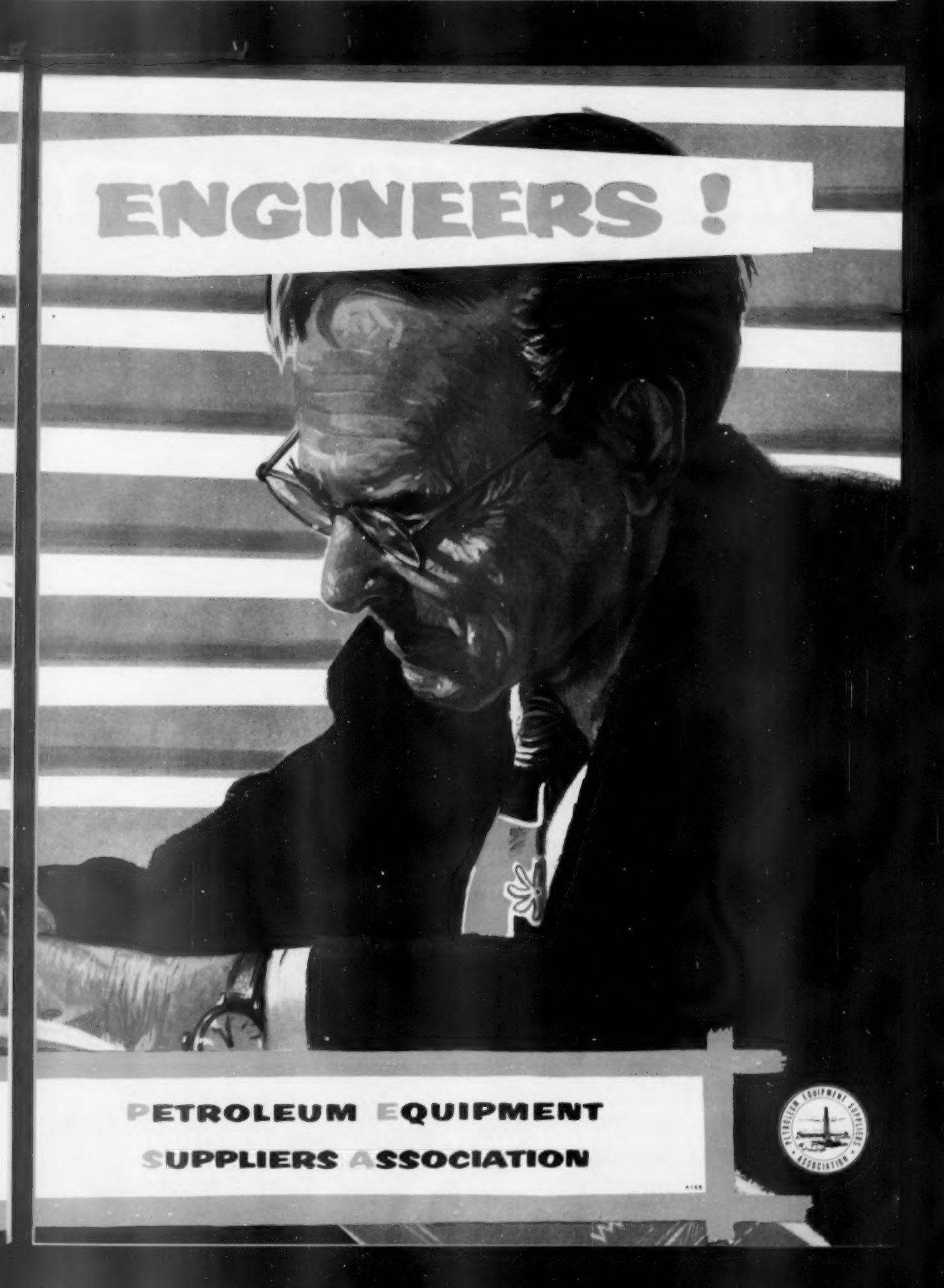
765	Research Scientists and Technologists
1840	Development Engineers for both product and service
445	Metallurgists and Technicians in Metallurgy
855	Engineers Engaged in Production Inspection and Final Inspection
5583	Field and Service Engineers

BIG SERVICE FOR A SMALL PROFIT VISION AND FAITH

That the service is big is shown by the heavy investment of manufacture-supply-service companies in scientific and engineering talent, and in billions of dollars in plant and equipment.

That the profit is small and the vision and faith great is shown by: 1. the small average dividends paid — 1.74%; 2. the average earnings plowed back into the building up of the companies in order to better serve the oil industry — 4.76%.

The petroleum manufacture-supply-service industry is truly rendering progressive, intelligent, and conscientious service to one of the world's greatest industries — oil.

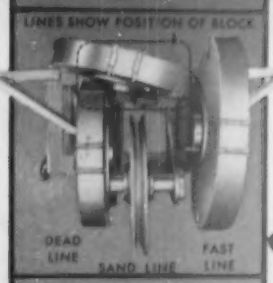

ENGINEERS !
PETROLEUM EQUIPMENT
SUPPLIERS ASSOCIATION
PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION
4155

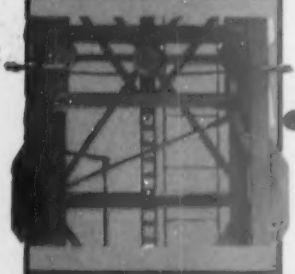
POWER SPEED SAFETY

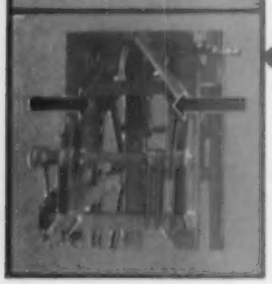
SUPER "38" WINCH & SUPER 65' MAST

have these MODERN, EXCLUSIVE Features

All Drives Equipped with WICHITA AIR-TUBE DISC CLUTCHES





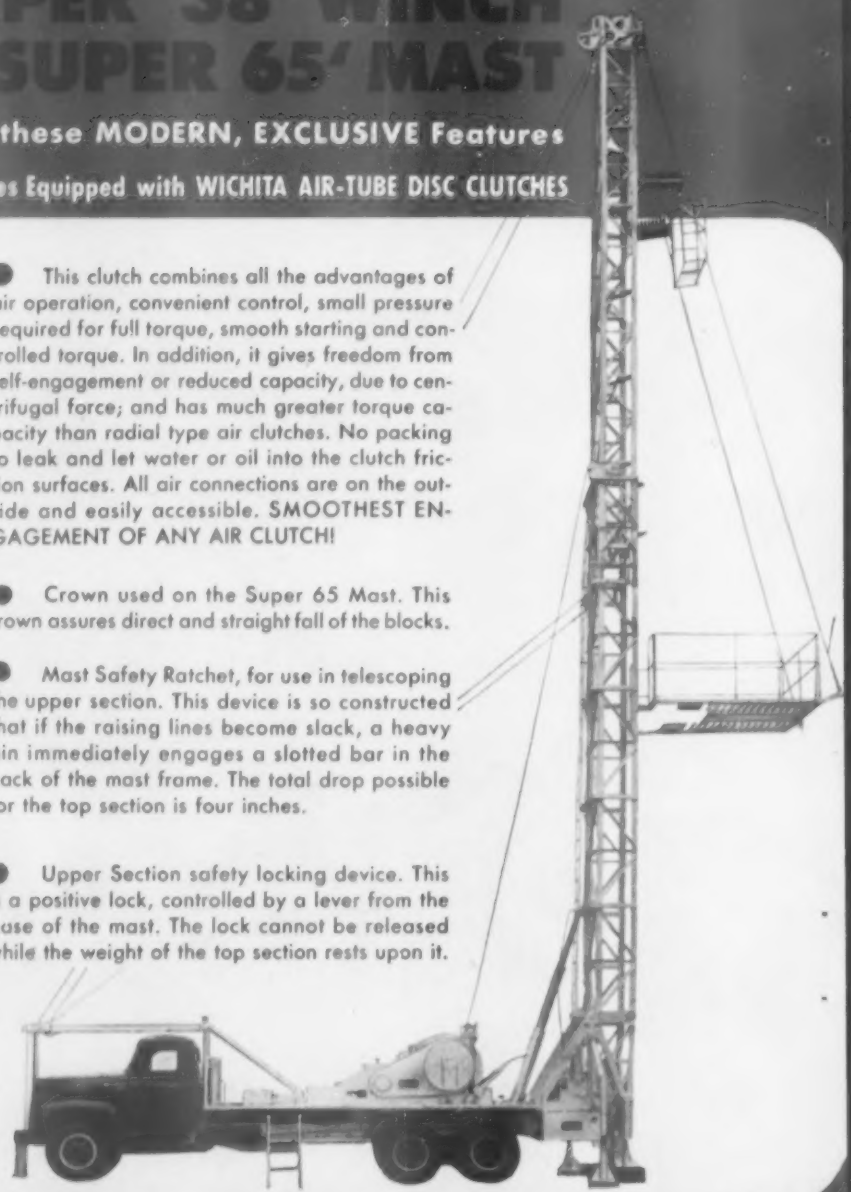


- This clutch combines all the advantages of air operation, convenient control, small pressure required for full torque, smooth starting and controlled torque. In addition, it gives freedom from self-engagement or reduced capacity, due to centrifugal force; and has much greater torque capacity than radial type air clutches. No packing to leak and let water or oil into the clutch friction surfaces. All air connections are on the outside and easily accessible. SMOOTHEST ENGAGEMENT OF ANY AIR CLUTCH!

- Crown used on the Super 65 Mast. This crown assures direct and straight fall of the blocks.

- Mast Safety Ratchet, for use in telescoping the upper section. This device is so constructed that if the raising lines become slack, a heavy pin immediately engages a slotted bar in the back of the mast frame. The total drop possible for the top section is four inches.

- Upper Section safety locking device. This is a positive lock, controlled by a lever from the base of the mast. The lock cannot be released while the weight of the top section rests upon it.



Wilson

THE FIRST NAME IN OIL FIELD WINCHES

WILSON MANUFACTURING CO., Inc.

THE HOME OF RED IRON
WICHITA FALLS, TEXAS
U. S. A.

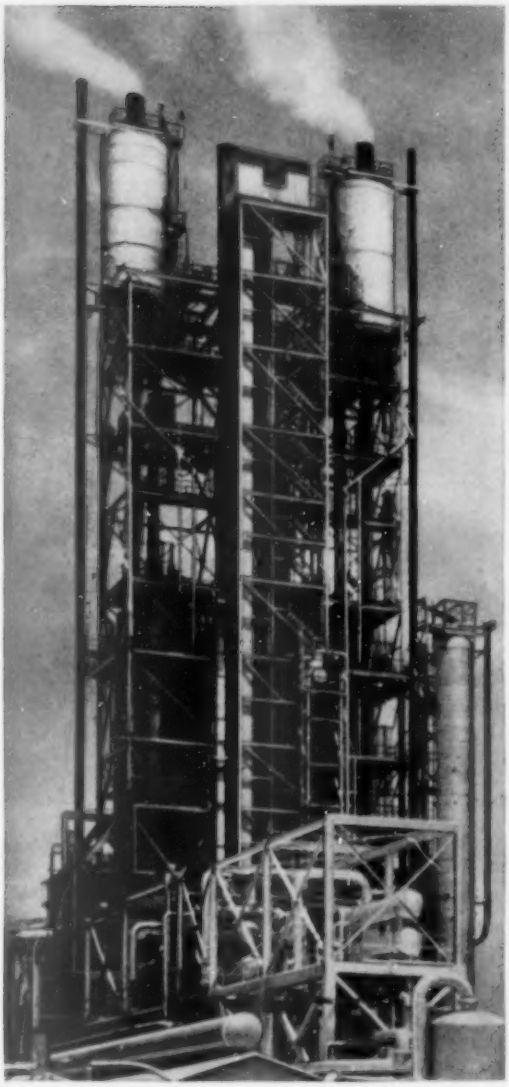
BE MODERN
BUY WILSON

when you install catalytic cracking equipment—

investigate the economy

of **TENAMENE**

inhibitor-sweetening



Nearly all catalytically cracked gasolines respond to Tenamene inhibitor-sweetening—The economy inherent in this single sweetening-gum inhibiting process should be considered by all refiners now constructing or contemplating the construction of cat-cracking units. Important factors which may influence your plans are:

Double function—Tenamene 2 acts both as antioxidant to inhibit gum formation, and as a sweetening agent.

Low cost—only 5 lbs. of Tenamene 2 per 1000 barrels of gasoline usually are needed . . . about ½¢ per barrel.

Low installation cost the process to sweeten with Tenamene is so simple, very little basic equipment is needed.

Savings on maintenance and operation—these costs are negligible compared to most other processes.

No octane loss—no danger of the presence of free sulphur —as in some processes.

No gasoline loss—no addition of chemicals at elevated temperatures.

No deleterious chemicals added—such as sulphur or copper.

PROMPT SERVICE: Eastman's highly qualified technical staff and modern gasoline laboratories are at your service. We welcome the opportunity to discuss Tenamene inhibitor-sweetening with you at your convenience. Contact your local representative or write to Eastman Chemical Products, Inc., Kingsport, Tennessee—a subsidiary of Eastman Kodak Company.

Tenamene

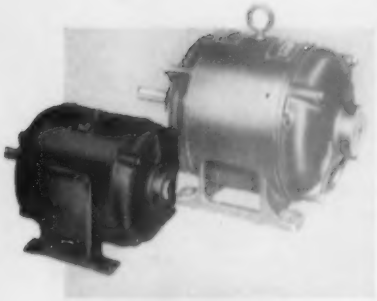
EASTMAN GASOLINE ADDITIVES

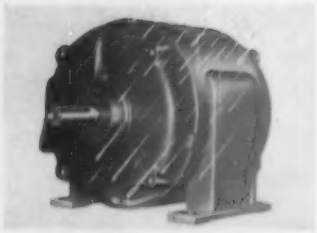
SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York—260 Madison Ave.; Framingham, Mass.—7 Hollis St.; Cincinnati —Carew Tower; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave.; St. Louis—Continental Bldg.; Houston—412 Main St. **West Coast: Wilson Meyer Co.:** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—821 Second Ave.

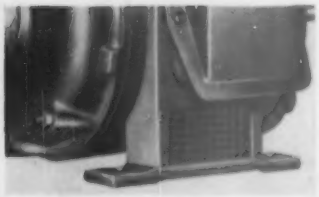
NEW Century WeatherGARD OIL FIELD MOTORS

These are the new re-rated motors — now available in some ratings.

Improved to Provide Top Performance . . . Long Life







SMALLER — LIGHTER

More uniform silicon-laminated steel; thinner, tougher "Mylar" slot insulation—just two of the many technical developments that help make these new Century Performance Rated Motors so much smaller and lighter.

NEW WEATHER-GARD CONSTRUCTION

New internal motor ventilating methods permit end bracket and frame design that gives far better protection from rain, snow and sleet . . . still maintain 40°C. temperature rise.

SCREENED OPENINGS

Screens in openings protect against birds, small rodents or animals, leaves or twigs from entering the motor.

EVEN MORE DEPENDABILITY

Improved plastic impregnating varnish and plastic insulated magnet wire provide unusual resistance to abrasion, moisture and heat. These new materials possess far better dielectric qualities. Die cast aluminum rotors are individually, dynamically balanced to assure freedom from vibration.

For more information *on these and other Century motors for the petroleum industry, see your supply store, or write Century for Oil Industry Bulletin 14-141-P1.*

Performance Rated® Century C MOTORS

⅛ to 400 H.P.

CENTURY ELECTRIC COMPANY

1806 Pine Street, St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

876

How Exon 402-A wipes out corrosion

Exact tolerances previously destroyed by corrosion

...are now kept micrometrically exact with

Boltaron 6200

Installation by Horace Blackman Co.

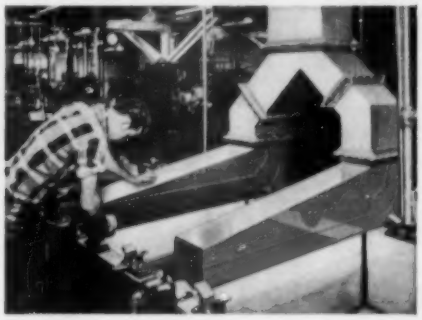
Photographs courtesy H. N. Hartwell & Son, Inc., Boston 16, Mass.

A 2-headed problem faced Norris-Thermador Co. of Los Angeles. They use large rings like stencils to plate copper onto kitchenware. Painfully exact tolerances are mandatory. But the corrosive solutions used ate away the tolerance, ruined rings, skyrocketed costs.

Engineers ransacked industry's resources for one material that could hold tolerance in so corrosive a solution. They found it in Boltaron 6200.

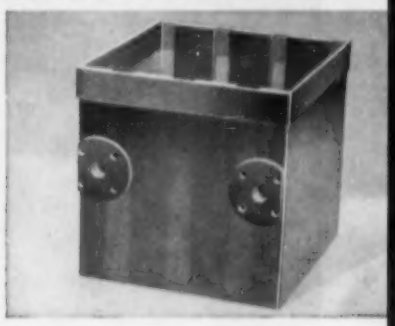
After a year, Boltaron 6200 rings show no sign of corrosion. Replacement costs? Wiped out!

★ For 18 months, sulfuric acid fumes have failed to corrode a Boltaron fume removal system at Electric Storage Battery Company, Fairfield, Conn.



★ Maintenance costs were wiped out at Cannon Electric Co., Los Angeles. A metal-corroding solution of 33% nitric, 33% sulfuric acid and 33% fluoride salts has left Boltaron ducts and tanks unmarked for a year.

Installation by Horace Blackman Co.



★ Eastman Kodak Co., Rochester, reports that Boltaron 6200 remained completely uncorroded by ferricyanide after 3 years, when no other material lasted 3 months.

Installation by Industrial Plastic Fabricators, Inc.

New rigid, extremely versatile, light weight materials are making corrosion a memory in industry all over America. These unplasticized polyvinyl chlorides are typified by Boltaron 6200.

Firestone's Exon 402-A resin meets Boltaron's exacting specifications —best assurance of uniform results under the most corrosive conditions.

These materials can be welded, sawed, sheared, stamped, milled, molded, planed, drilled, embossed, rolled and cemented—on conventional woodworking or metalworking equipment.

For details that will interest you in particular, call or write:

Firestone

EXON

Chemical Sales Division

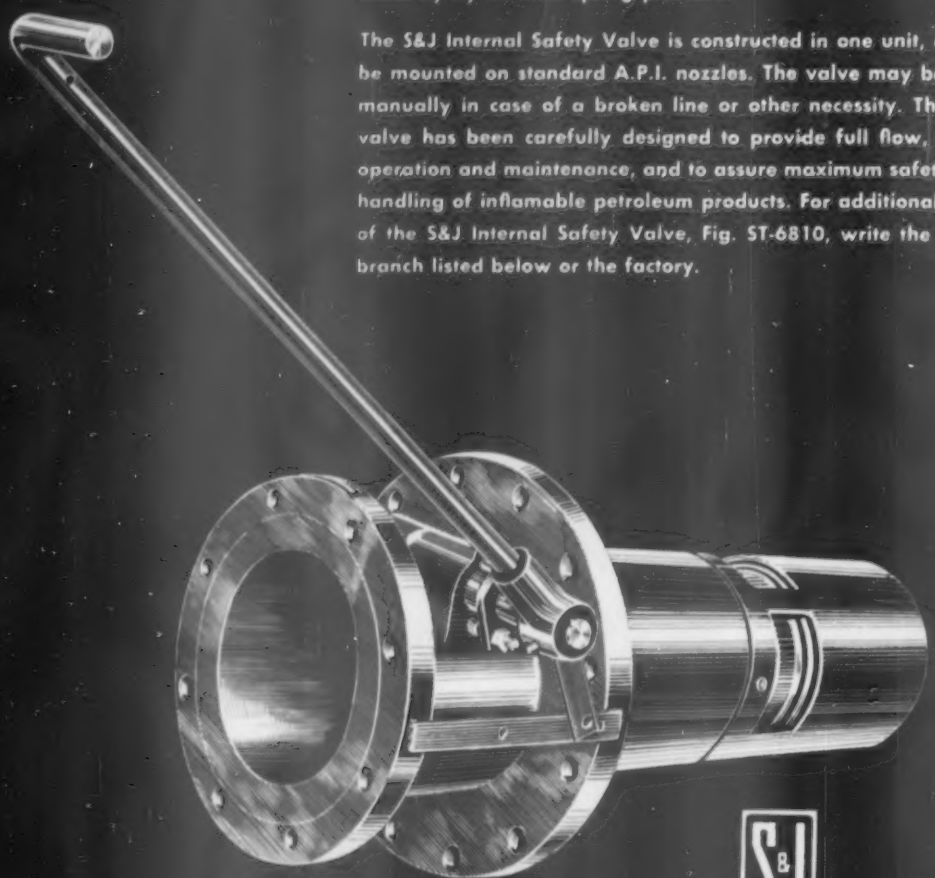
FIRESTONE PLASTICS COMPANY, DEPT. 24B, POTTSTOWN, PENNSYLVANIA
A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

NOTE: Firestone supplies the resin only, does not manufacture the end product.

For GREATER SAFETY...

It's the Shand & Jurs ruggedly constructed Internal Safety Valve for petroleum storage and transfer tanks. Designated by S&J as Fig. ST-6810, this all-steel safety valve must be opened manually, and can be held open by a chain and fusible link which will melt at 165° F. Should an exposure fire endanger the tank and its contents, the fusible link will melt, allowing the internal valve to close instantly by internal spring pressure.

The S&J Internal Safety Valve is constructed in one unit, and can be mounted on standard A.P.I. nozzles. The valve may be closed manually in case of a broken line or other necessity. The entire valve has been carefully designed to provide full flow, ease of operation and maintenance, and to assure maximum safety in the handling of inflamable petroleum products. For additional details of the S&J Internal Safety Valve, Fig. ST-6810, write the nearest branch listed below or the factory.



Shand and Jurs Co.
BERKELEY 10, CALIFORNIA

NEW YORK
342 Madison Ave.

HOUSTON
M & M Bldg.

TULSA
Thompson Bldg.

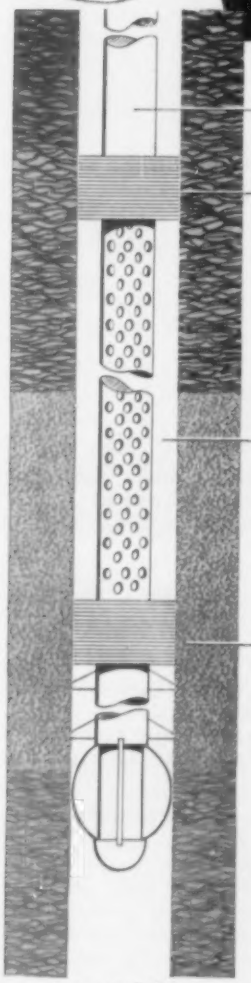
CHICAGO
10409 S. Western Ave.

LOS ANGELES
714 W. Olympic Blvd.

REPRESENTATIVES:
SEATTLE: Nebar Supply Company, 3000 Western Avenue
MONTREAL: Lytle Engineering Specialties, Ltd., 360 Notre Dame St. W
TORONTO: Lytle Engineering Specialties, Ltd., 85 Richmond St., W.
VANCOUVER: P. D. McLaren & Son, Ltd., 3277 Main Street
CARACAS: Sinclair Spence, C.A., Edificio Galipan
ENGLAND: Whessoe, Ltd., Sales: 25 Victoria St., London, S.W. 1
Whessoe, Ltd., Works: Darlington, County Durham

another Johnston first!
SELECTIVE ZONE TESTER

Get tests at any level without tail pipe!



- Test more than one zone with a single trip in the hole!
- Eliminate cost and hazard of setting on cement plug!
- Evaluate zones passed up while drilling!
- Pin-point gas/oil and water/oil contact!
- Save rig-time and money!

Watch for more information on Johnston's NEW . . . FIELD PROVEN SELECTIVE ZONE TESTER

Write for Brochure

Patent Applied For

JOHNSTON TESTERS

first in drill stem testing

HOUSTON, TEXAS

LOS ANGELES, CALIF. • CALGARY, CAN.

ZT-541

FORMATION AND CASING TESTING — JOHNSTON

Don't Abandon Your *SOUR* Wells!

This Typical BS&B Desulfurizer Unit "Sweetens" 100,000 SCF of "sour" gas per day in Southwest Texas.

When Inquiring About A BS&B Desulfurizer To Meet Your Requirements, Please State —

1. Expected Maximum And Minimum Rate Of Gas Flow.
2. Pressure And Temperature Of The Gas.
3. Sulfur And Carbon Dioxide Content Of The Gas In Vol. %, Mol % Or Grain/SCF Of Gas.
4. Whether Electricity And/Or Cooling Water Are Available At Installation Site.

A BS&B DESULFURIZER

Will Economically "Sweeten" Your Gas To One Grain H_2S Or Less Per 100 SCF!

If you have considered abandoning or "shutting-in" your "sour" wells because your production would not economically justify the installation of expensive desulfurizing equipment, then you should know about the BS&B Desulfurizer!

This unit will economically "sweeten" the "sourest" gas to one grain of hydrogen sulfide or less per 100 SCF, and will enable you to utilize the production from all wells on your lease — both "sweet" and "sour"! Carbon dioxide present in the gas will also be removed. BS&B Desulfurizers are available in any size to meet your requirements.

With the rapidly increasing demand throughout the country for natural gas as a fuel and as "raw stock" for the Petro-Chemical Industries, gas producers are centering their attention more and more on the production of their "sour" gas reserves with the help of BS&B Desulfurizers. Why don't you?

Let your BS&B Representative give you full details . . . or you may write to . . .

Oil & Gas Equipment Division, Dept. 1-A7.

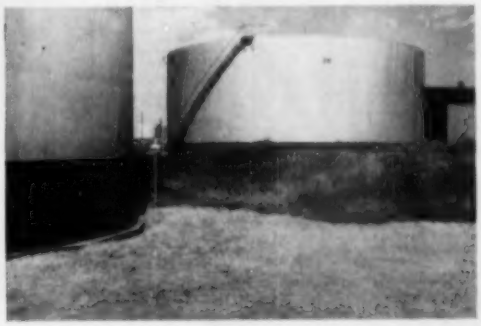
EFFICIENCY OVER 60 YEARS BS&B RELIABILITY

BLACK, SIVALLS & BRYSON, INC.

1708 West Main Street Oklahoma City, Oklahoma

1. "Telvar" W has extra-long residual action. Track on right was treated in April; photograph was taken in August. Ideal for sidings, around loading docks, etc.

2. Note the thorough weed control under and around this security fence and power substation.



3. Fire hazards are reduced around oil storages and pipelines from thorough, long-term weed control with "Telvar" W.

Kill weeds with Du Pont "Telvar" W *Weed Killer* —long residual action lasts all season

HERE'S a new, low-cost way to solve your weed control problems. Just one application of "Telvar" W can get rid of unwanted vegetation for a full growing season or longer. This powerful weed killer works through the roots . . . and remains in the ground to prevent regrowth. "Telvar" W keeps storage and working areas clear, neat and accessible . . . kills vegetation that may cause a fire hazard or a cover for vermin.

SAVES MONEY, TIME AND WORK . . . One spray usually does the job . . . repeat applications are seldom necessary. No bulky chemicals to handle or store. Just 1 to 1½ pounds per 1000 square feet (40 to 60 pounds per acre) will do the job.

EASY TO USE . . . "Telvar" W is a wettable powder, ready to mix with water; can be applied by machine equipment or ordinary knapsack sprayer. It doesn't corrode metals, is non-flammable, has unusually low toxicity and it is non-volatile.

IF YOU DON'T HAVE EQUIPMENT to apply "Telvar" W, a custom sprayer will do the job for you. In fact, you may want to take advantage of his year-round service.

On all chemicals always follow directions for application. Where warning or caution statements on the use of the product are given, read them carefully.

MAIL THIS COUPON FOR FREE BOOKLET

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Department, Rm. 4026
Wilmington, Delaware

☐ Please send me your booklet describing low-cost weed control with "Telvar" W. ☐ Send me the name of my nearest supplier. ☐ Give me the name of a near-by custom sprayer.

Name_____

Firm_____

Position_____

Address_____

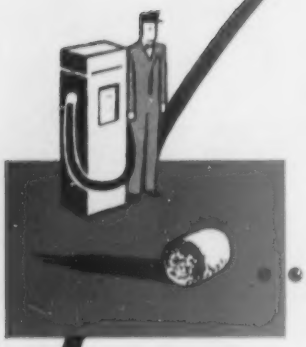
City_____

DU PONT TELVAR W
REG. U.S. PAT. OFF. TRADE-MARK

weed killer for low-cost weed control

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

with ATLANTIC



. . . it's the catalyst that counts!

The Davison Chemical Corporation has teamed with The Atlantic Refining Company in the development of a catalyst for reforming straight run and cracked gasolines to a product of higher octane level. Among the important tasks delegated to Davison was the translation of this catalyst from laboratory to commercial production and at the same time impart optimum selectivity, stability, ruggedness and regenerability.

Today, Davison is producing Atlantic Platinum Reforming Catalyst on a commercial scale and shipments are being made at an increasing rate to licensees of the Atlantic Catforming Process. Davison has an outstanding record of this type of development in many fields of commercial catalyst production. If you have a catalyst problem, see your Davison Field Service Engineer or write.

Progress Through Chemistry

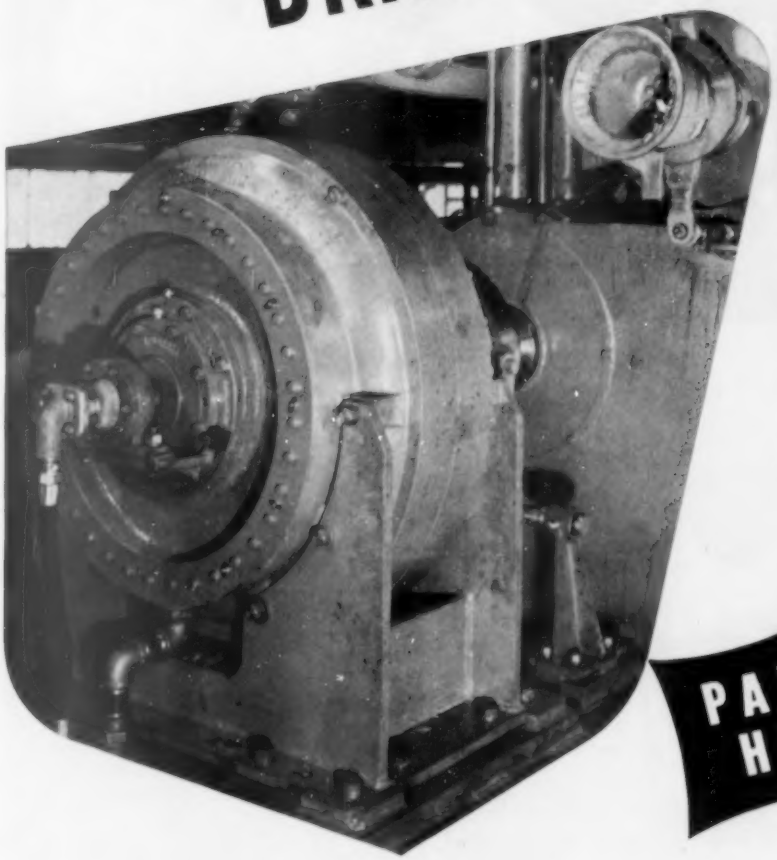
DAVISON CHEMICAL COMPANY

Division of W. R. Grace & Co.

BALTIMORE 3, MARYLAND

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, TRIPLE SUPERPHOSPHATE, PHOSPHATE ROCK, SILICA GELS AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO GRANULATED FERTILIZERS

NO OTHER DRAWWORKS BRAKE



CAN MATCH the SAFETY, ECONOMY and DEPENDABILITY of the...

PARKERSBURG HYDROMATIC

For more than 25 years the Hydromatic Brake has helped make deep drilling operations more economical, safer, and faster.

The Hydromatic is practically 100% failure proof. It has only one major moving part and there is nothing to fail or get out of order as long as it is operated properly and within its rated capacity.

The dependable, trouble-free operation of the Hydromatic saves operators thousands of dollars in stand-by equipment, maintenance expense, and drilling time . . . and it saves hundreds of dollars more on its first cost. No other drawworks brake on the market costs as little to buy . . . as little to operate and maintain.

Before you order another drilling rig, get all the facts and figures on the Hydromatic from your Parkersburg representative for drilling to any depth 5,000′ to 20,000′ . . . or more.

5422

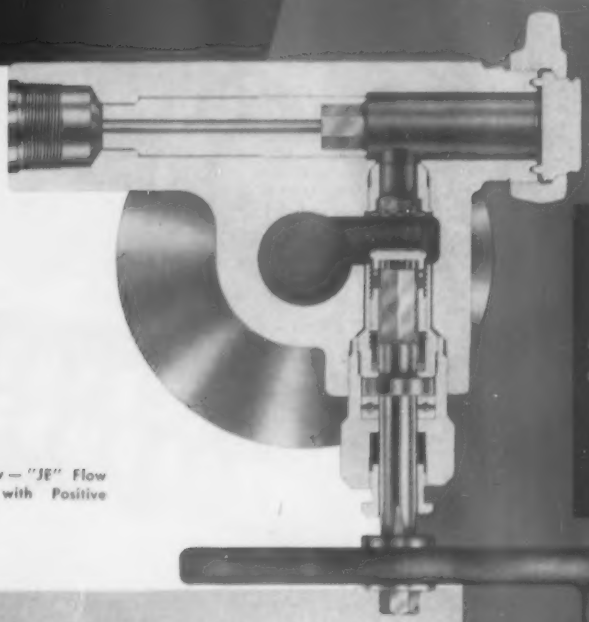
THE PARKERSBURG RIG & REEL COMPANY • PARKERSBURG, WEST VIRGINIA

Division of Parkersburg-Aetna Corporation

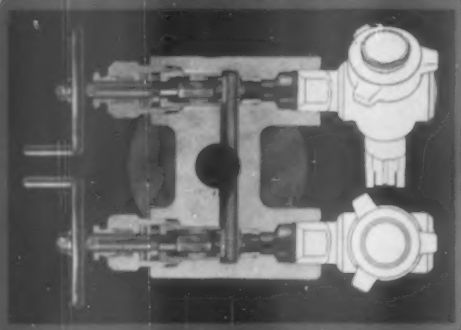
Best Seller

because it's the Best Buy!

O·C·T "JE" FLOW CONTROLS



Top View — "JE" Flow Control with Positive Choke.



The O-C-T Dual Flow Control is an outstanding companion to the "JE" Flow Control units which have gained universal acceptance in oilfields all over the world. This unit replaces 13 different fittings.

Since O-C-T introduced this compact, easy-operating "JE" Flow Control Unit in 1946, **more trees of all makes** have been topped from the master valve up with this unit than any other make. And there is good reason why O-C-T "JE" Flow Control Units are now on nearly 10,000 trees. ***It is the only flow control on the market that gives you the advantage of both a choke and a true valve type gate assembly and seating arrangement.*** The valve in your O-C-T Flow Control unit is a complete valve type gate assembly . . . with ball bearing construction to assure easy, quick operation. Specify O-C-T "JE" Flow Controls to your supply store. Use it to replace a tee or cross, wing valve, choke and bottom hole test adapter. Use it to save as much as $300.00 on every tree. Let your O-C-T representative show you the many other advantages that have made "JE" Flow Controls the most dependable product ever offered the oil industry. All O-C-T products are available through more than 700 supply store locations.

O-C-T makes the only flow control unit that gives you the advantage of both a choke . . . positive or adjustable . . . and a true valve type gate assembly in a single compact unit.

Oil Center Tool Co.

P. O. BOX 3091, HOUSTON, TEXAS

Expert Representatives: Sterling Areas — Le Grand, Sutcliff & Gell, Ltd., Rochester, Kent, England. Address Export Inquiries

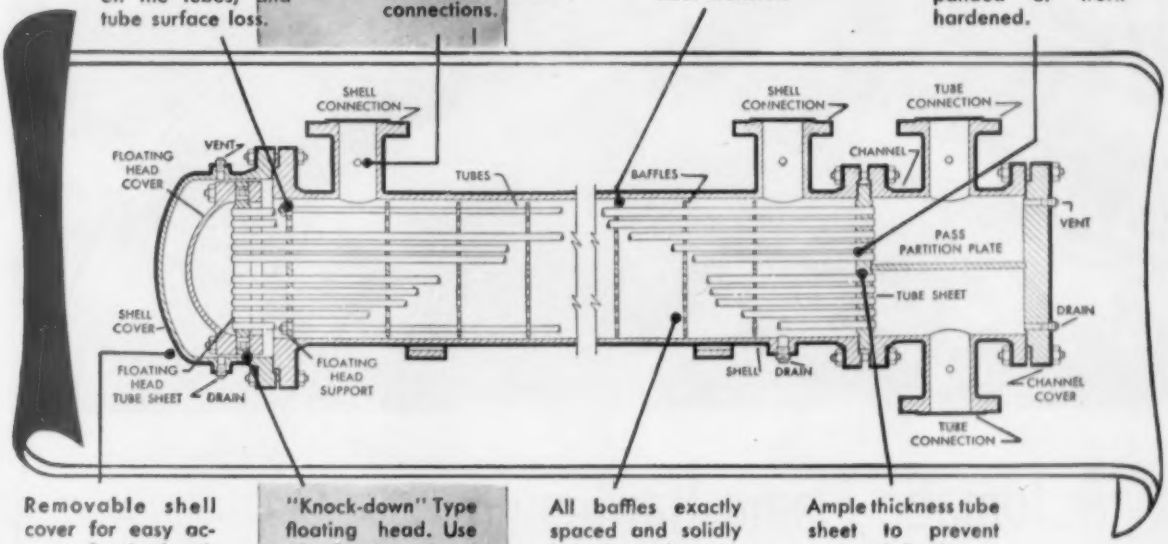
HEAT EXCHANGER EFFICIENCY starts with SUPERIOR DESIGN

"Do-Nut" shape support plate offers maximum support to the floating head without undue strain on the tubes, and tube surface loss.

Connection for pressure gauge and thermometer provided on all flanged connections.

Baffles — cross flow segmental type machine cut and drilled. Close tolerances assure maximum heat transfer.

Tubes — expanded into tube sheets by means of electronic controlled roller expanders, tubes cannot be over expanded or work hardened.



Removable shell cover for easy access to floating head.

"Knock-down" Type floating head. Use of floating head minimizes thermal expansion strains.

All baffles exactly spaced and solidly bolted together with heavy tie rods and spacers.

Ample thickness tube sheet to prevent undue deflection at pass partition plate.

The features of design which make a heat exchanger good are the features which contribute most to efficient, long-lived, trouble-free performance *under your operating conditions*. Since operating conditions are seldom exactly duplicated, industrial heat exchangers are usually custom-built . . . and design characteristics are different for each application.

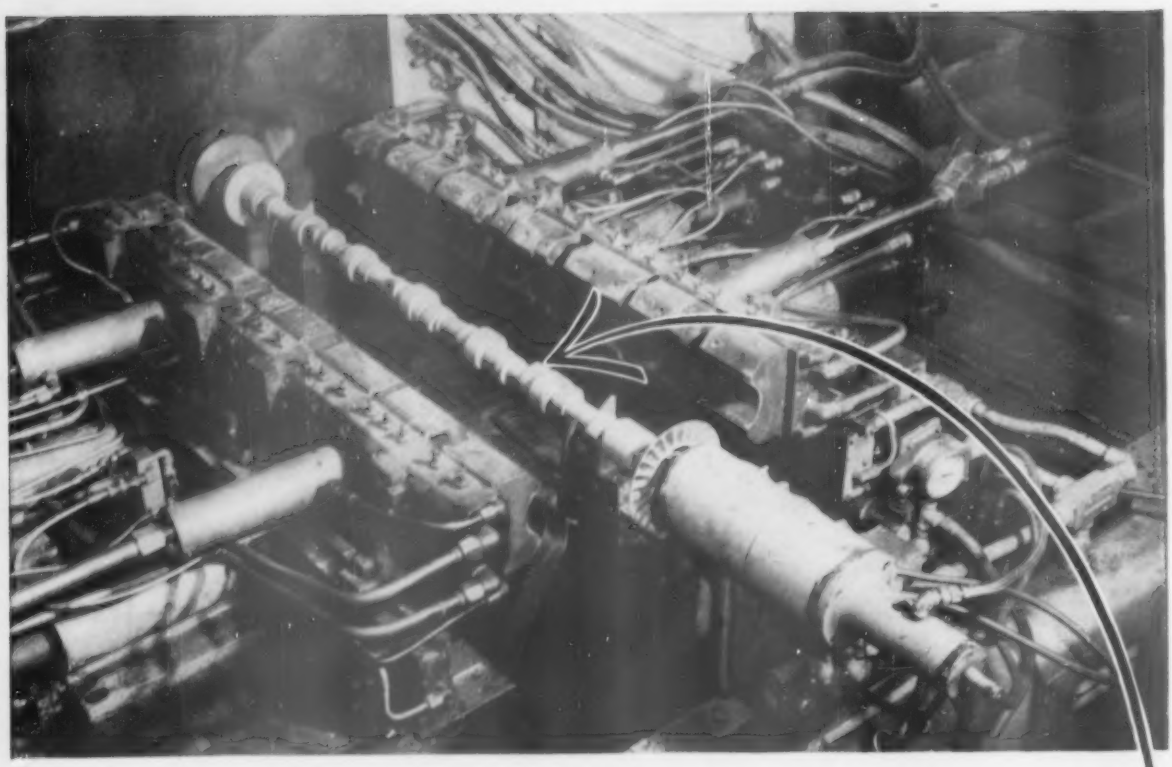
But while design characteristics differ, the fundamentals of good heat exchanger construction never change. If you are considering the purchase of heat exchanger equipment, we welcome the opportunity of showing you how SUPERIOR Heat Exchangers combine tested fundamentals with design features that fit your use . . . for performance you can BANK on.

Write for your copy of catalog 6011

for performance you can **BANK** *on*

SUPERIOR HEAT EXCHANGERS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 18, N.Y.



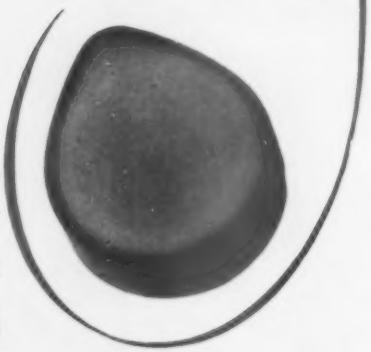
Automatic Flame-Hardening Boosts Production 300%

Using an automatic oxy-acetylene flame-hardening machine, a leading manufacturer of trucks and marine equipment increased the production of flame-hardened gears, bearings, and camshafts 300 per cent. Parts are flame-hardened on as many as 22 different surfaces in fast, simple operations.

The flame-hardening process produces wear-resistant surfaces on large and small sections without heating the entire part . . . Distortion is at a minimum, and case depth is easily and accurately controlled. Flame-hardening is fast and relatively simple compared with other methods of hardening metal such as nitriding and carburizing. Low cost, portable flame-hardening equipment is available for the majority of applications.

Your local LINDE representative will be glad to show you how to produce machine parts with a tough, ductile interior and a hard, wear-resistant surface. Start saving now, call him for more information on flame-hardening.

A cross-section view of this camshaft shows an even, uniform depth of the hardened surface.

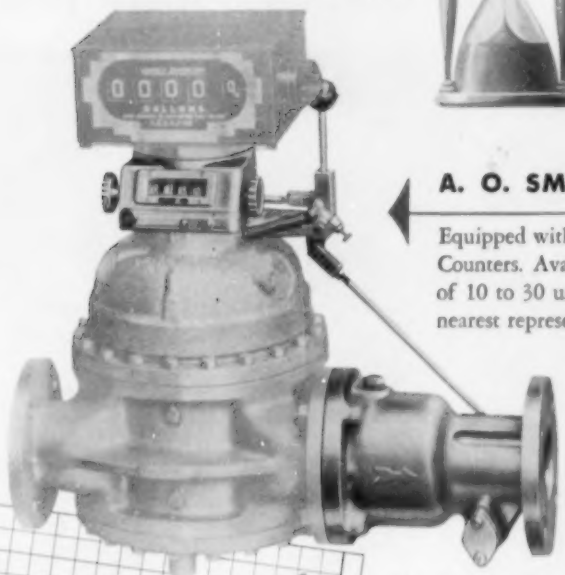


LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street · UCC · New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto

Linde
Trade-Mark

"Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

TIME TESTED

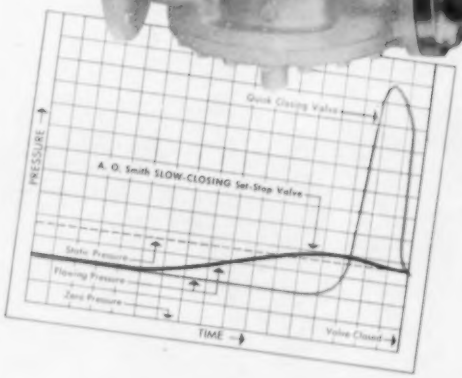


A. O. SMITH S-35 METER

Equipped with Slow-Closing Set Stop Valve and Counters. Available with various closing cycles of 10 to 30 units, depending on flow rates. See nearest representative for complete information.

TYPICAL INSTALLATIONS:

Truck Tank Service. Bulk Plants and Terminals. Batching. Blending. Any application where automatic predetermined quantity control will speed work, save steps, lighten the shock. Remember, this equipment can be added to already installed A.O.Smith Meters.



RED curve indicates severity of shock caused by ordinary quick-closing valves.

BLACK curve shows smooth, anti-shock action with A. O. Smith Slow-Closing Set Stop Valves.

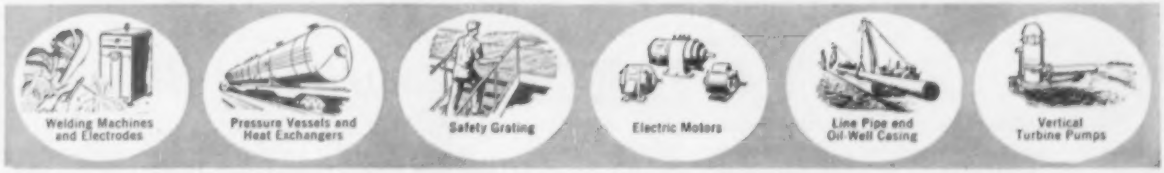
Thousands of A. O. Smith Slow-Closing Automatic Set Stop Valves are seeing constant daily service year after year in a wide variety of applications. They quickly pay for themselves because they protect equipment, speed service, lighten the work and increase the efficiency of your operation.

Through research ...a better way

A.O.Smith
CORPORATION

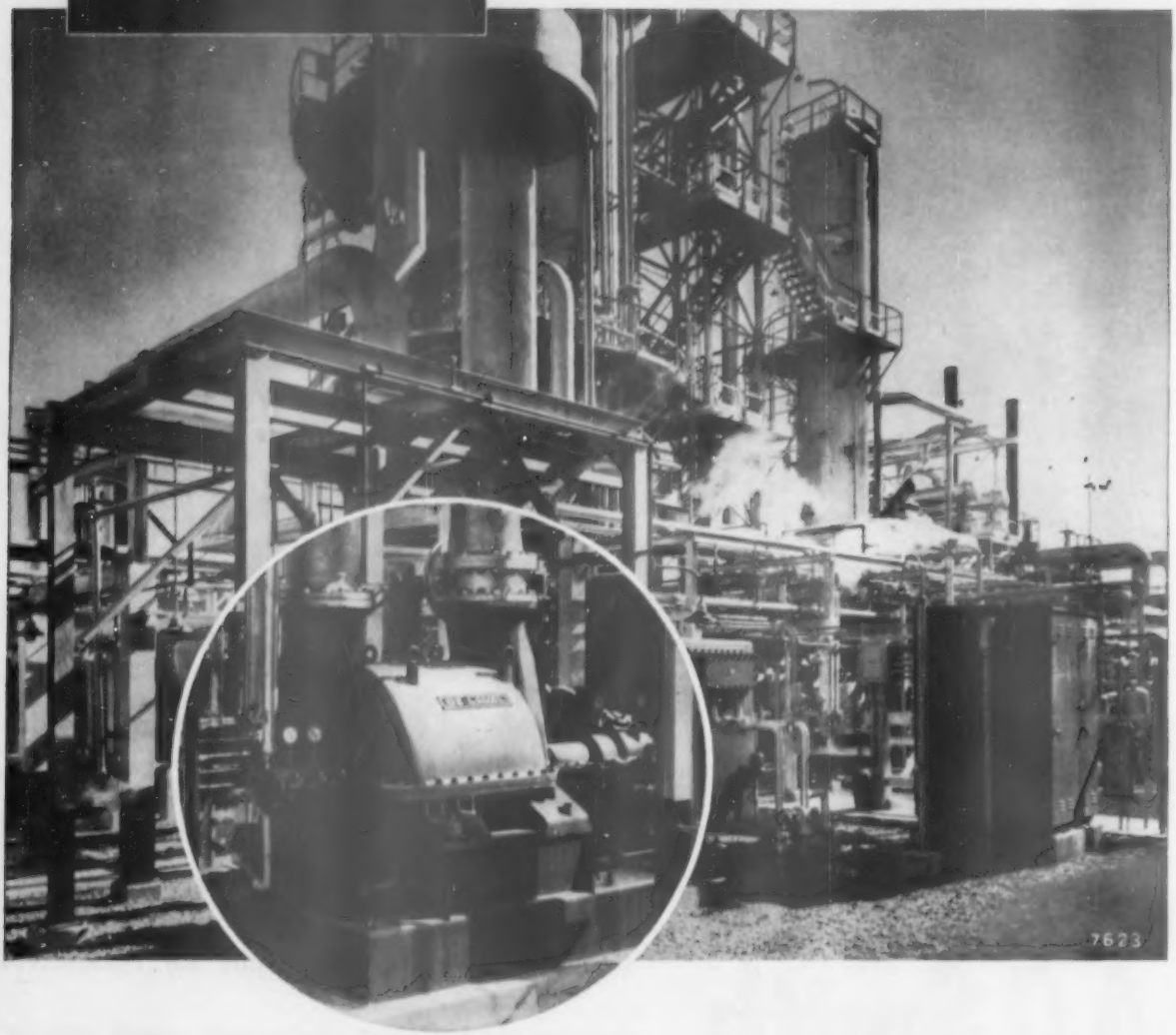
METER DIVISION

Factories: 5715 Smithway St., Los Angeles 22, Calif.; P. O. Box 500, Succasunna, N. J. Offices: Atlanta, Chicago 7, Houston 20, Los Angeles 22, New York 17. Canada: Toronto 12, Vancouver 1. International Division—Milwaukee 1, Wis.



DE LAVAL
CENTRIFUGAL BLOWER

delivers 17,400 cfm for Elreco's new cat

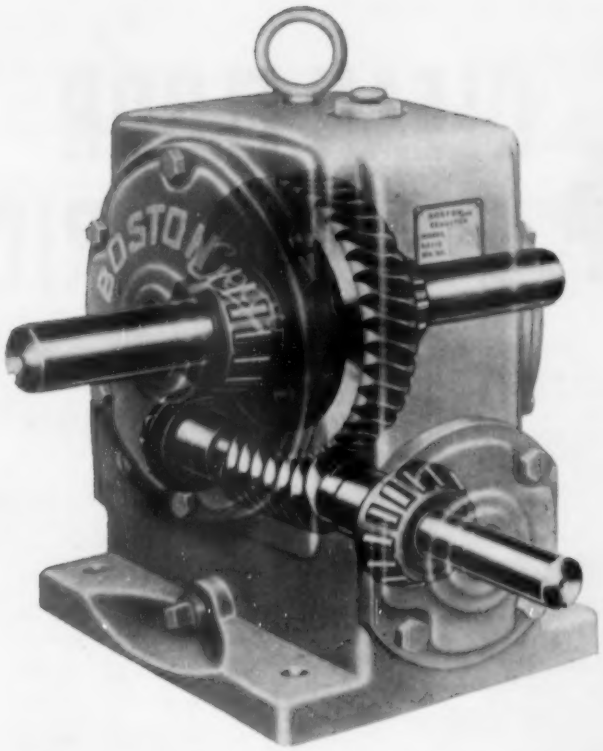


This De Laval Centrifugal Blower, on stream at the El Dorado Refining Company's new cat cracker at El Dorado, Kansas, supplies 17,400 cubic feet of air per minute for regeneration of the spent catalyst.

This plant, built in record time of ten months by The Refinery Engineering Company, is designed for a charge capacity of 4,300 barrels per day at 75% conversion. Elreco is another of many refineries which have chosen De Laval for dependable blower performance under heavy-duty, continuous operation. Rugged castings, husky, perfectly balanced rotor and externally mounted, cylindrically seated bearings are design features that reduce maintenance and insure long service. Send for Bulletin 0500 containing complete data.

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY
810 Nottingham Way, Trenton 2, New Jersey



How to make a worm gear stop spitting teeth

When a speed reducer transmits power to a machine, the output shaft takes a beating from the torque effect necessary to carry the load. If the steel can't take it, gear teeth wear excessively. Or they snap off.

Boston Gear Works had the problem with its Gear Reductor. Working with Republic's 3-D Metallurgical Service, they tortured gears and shafts made of many different steels.

Republic metallurgists recommended Cold Drawn 4140 Alloy Steel for the worm gear shaft for toughness and strength. For the worm and the worm shaft, which are integral, where hardness, machinability and smoothness were needed, 4615 Alloy Steel.

Result: A highly polished finish that assures proper meshing with the worm gear; a minimum of wear; a reductor that easily handles shock loads and 24-hour running conditions.

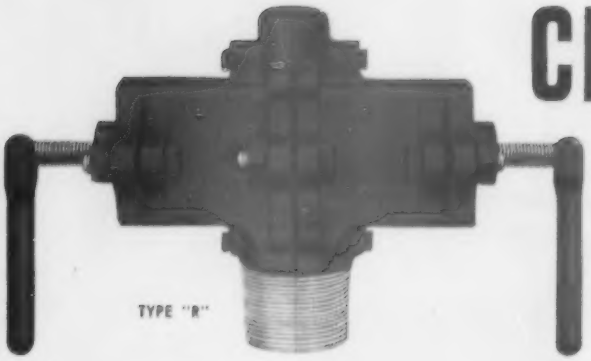
What about your problems? Perhaps the right alloy steels, recommended by Republic's 3-D Service, can mean better production rates. A better product. Or lower costs. Sometimes, all three. Phone your nearest Republic office for the facts. Or write to:

REPUBLIC STEEL CORPORATION
Alloy Steel Division · Massillon, Ohio
GENERAL OFFICES · CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

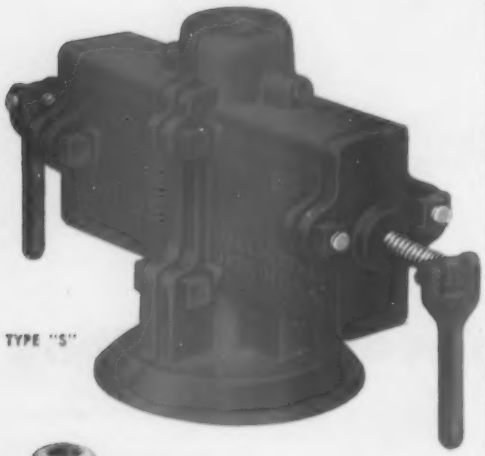
REPUBLIC ALLOY STEELS

Other Republic Products include Casing – Tubing – Line Pipe – Steel and Plastic Pipe – Bolts, Studs, Nuts and Rivets – Heat Exchanger Tubes

CLEAN FLOOR SAFE DERRICK



TYPE "R"



TYPE "S"

TYPE "D"

TYPE "B" RELEASING ATTACHMENT

GUIBERSON *Wire Line Oil Savers*

for Excellent Pack-Off—Clean, Dry Line

3 to choose from—take your choice and know that if it's Guiberson, it's *good!*

TYPE "R"—for tubing. Simple, inexpensive, effective. Split housing for easy installation.

TYPE "S"—for casing or tubing. Economical, simple—similar to "R" but heavier construction, flange bottom or tubing connection.

TYPE "D"—for tubing or casing. Two independent sets of rubbers, single end operation, make it cost more but still very economical. Pin or flange adapter connection.

Non-sparking brass bushings and guides throughout . . . long-wearing rubbers . . . finest Guiberson precision construction.

TYPE "B" RELEASING ATTACHMENT—
Positive release for Oil Savers—prevents tool damage.
Easy to attach, pressure won't release it.

Better Be Safe Than Sorry!

THE
GUIBERSON
CORPORATION
ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.
Sold By Leading Oil Field Supply Stores Everywhere

They Say—

The Onassis Deal . . .

. . . Onassis—The Mystery Man

"Aristotle Socrates Onassis is a true mystery man of international business in the tradition of Ivar Kreuger and Basil Zaharoff. He moves in strange ways, and sometimes with spectacular success.

"None of his achievements to date has matched for sheer resourcefulness the agreement he has negotiated with the government of Saudi Arabia which grants him what eventually will amount to a monopoly in the carriage of all petroleum produced in that country . . .

". . . The chief victim . . . is Aramco, which has large investments in Arabia. But will Saudi Arabia itself be far behind? Not, we would think, for very long."

Editorial in the New York Journal of Commerce.

. . . Funds for Saudi Arabia

"In identical letters which I directed to the Secretary of State and Foreign Operations Administrator on May 18, 1954, I called attention to a situation involving a monopolistic oil tanker agreement between Mr. A. S. Onassis and the Saudi Arabian government . . . With reference to any funds to be requested by the administration for Saudi Arabia and other Arab states in the Mutual Security Bill, I asked whether the monopolistic concession granted under this agreement should in any way affect the administration's request for funds.

" . . . I received a response from Assistant Secretary of State Thruston B. Morton which . . . (said) that the amount of funds contemplated for Saudi Arabia is of extremely modest proportions and, in view of our close relations with Saudi Arabia, the financial assistance is consistent with and in support of United States policy objectives in the Middle East.

". . . Foreign Operations Administrator Stassen replied . . . that any withholding of the small amount of aid for Saudi Arabia would hinder rather than further American interests."

Statement made by Congressman Emanuel Celler of New York.

. . . Clear Discrimination

"The agreement is a clear discrimination to international tanker traffic . . .

"We are shocked to see influential

NICHOLSON W. O. TRAPS

Cannot Leak Live Steam

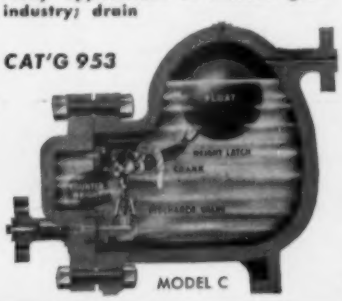
Even though re-evaporation completely dries up its body, a Nicholson weight-operated trap will not leak live steam. Widely used for steam purifiers, super-heated steam lines, headers, separators, heaters, etc.

DRAIN GASOLINE, WATER, OIL

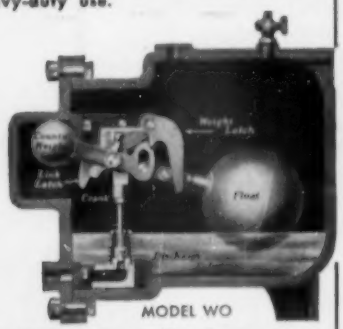
Nicholson W. O. traps also have many applications in natural gas industry; drain gasoline from scrubber head of booster and gas lift compressors; gasoline, oil or moisture from gas well separators, accumulators, after-absorbers, etc.; package natural gasoline plants; gas lines.

4 TYPES—press. to 200, 500, 650, 1500 lbs.; for every large-capacity, heavy-duty use.

CAT'G 953



MODEL C



MODEL WO

210 Oregon St., Wilkes-Barre, Pa.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

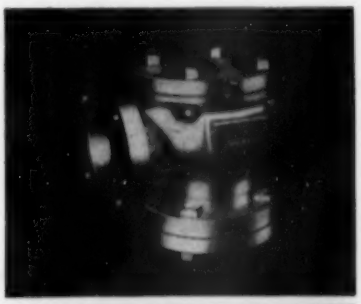
OCECO

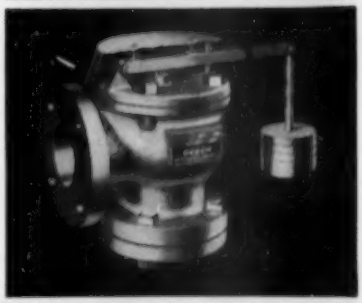
vacuum

and

pressure

RELIEF VENTS





● Ideally suited for a wide variety of vacuum and pressure relief requirements. Cast steel housings. Bronze or stainless steel trim. 3″ x 3″; 4″ x 4″; and 6″ x 6″ sizes. Standard A.S.A. flanges. Vacuum setting, 1½ oz. to 1 lbs. per square inch. Pressure relief valves provided with a lever and weight for settings from 2 lbs. to 30 lbs. per square inch as desired. Write for fully descriptive data sheet.

OCECO TANK FITTINGS

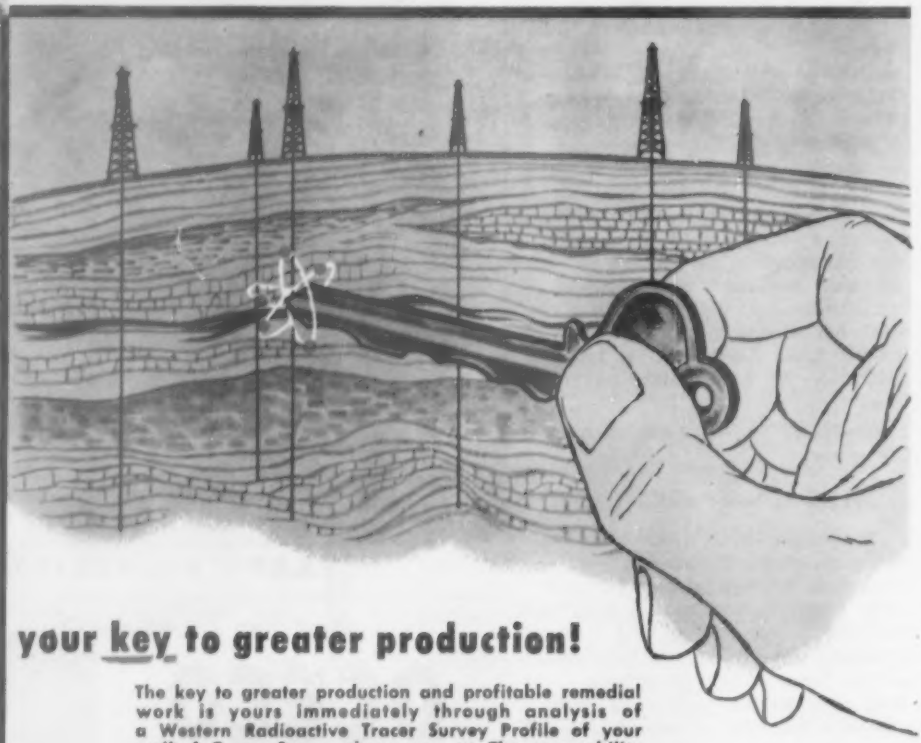
THE JOHNSTON & JENNINGS CO.

division of PETTIBONE MULLIKEN CORP.

4751 West Division St. • Chicago 51, Illinois

WESTERN "Tracer Survey"

FOR ACCURATE SUBSURFACE DATA



your key to greater production!

The key to greater production and profitable remedial work is yours immediately through analysis of a Western Radioactive Tracer Survey Profile of your well. A Tracer Survey shows you: The permeability picture, communications between perforations and zones behind casing, casing shoe and pipe leaks, location of blocking materials, zones selectively acidized previously, fractured zones, best formation packer seats, cement tops.

By adding radioactive particles to fluid and pumping it into your well, a subsequent Gamma Ray Investigative curve will give you an accurate analysis of subsurface conditions.

Western Tracer Surveys, therefore, will guide you accurately in completion and remedial work and, in addition, also will help you solve many down-hole difficulties.

Recordings of story-telling radiations are made on Western's regular "PROVED-ACCURACY" GAMMATRON instruments and can be run in either casing or tubing. Painstaking analysis of every profile is made by specially trained and experienced engineers.

Consult with a Western Engineer on the many ways WESTERN RADIOACTIVE TRACER SURVEYS can serve you . . . and save you money!

THE WESTERN COMPANY

General Offices:
Midland, Texas

Engineered Well Services

ACIDIZING
PERFORATING
Jet and Bullet

FRACTURIZING
GAMMATRON
Radioactivity Well Logging

shipowners causing a complete breakdown of all principles and morals formerly accepted as a basis for tank traffic the world over.

"Knowing that oil companies share this view, we are surprised that world banks and financial institutions are watching this development with their hands in their laps."

L. U. Svendsen, president of the Norwegian Shipowners Association, in a statement given the Oslo Daily Aftenposten.

Depletion in Canada

"The truth is not that the depletion allowance gives oil an advantage over other industries, but that in practice in Canada it mostly fails to give the oil operator any assistance at all. The philosophy of that assistance is there, but the mechanics of the tax system fail to carry out the intent of the philosophy. This is because the depletion allowance under the Canadian system is calculated on the net income. The cost of exploration and development is such that many oil companies are making insufficient net income to obtain any benefit from the depletion allowance. . .

". . . And a point worth stressing is that the Canadian operator is suffering in this respect in comparison and in competition with his American brother who is granted a depletion allowance under the United States system as a percentage of his gross income.

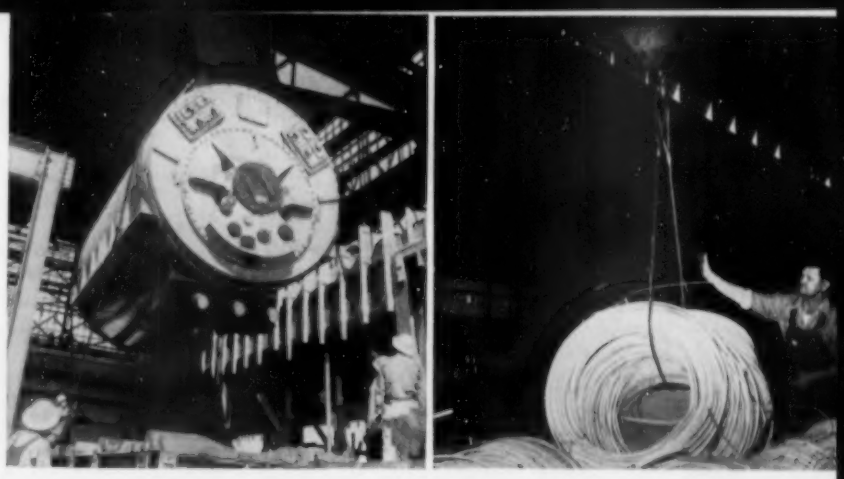
"Perhaps at this point one of my earlier remarks may take on added significance. You may recall that I said: 'The underground wealth of our nation is the envy of the world. But unless . . . we create real savings we . . . shall not have the wherewithal to raise our own wealth above the ground. Others will do what we should have done for ourselves'."

W. M. V. Ash, president of Shell Oil Co. of Canada, Ltd., in an address before the annual meeting of the Canadian Manufacturers Association in Jasper, Alta.

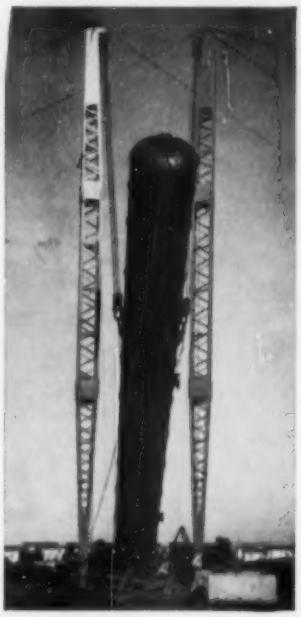
No Monopoly in Turkey

Dear Sir:

Anent a piece appearing in The Oil and Gas Journal of May 17th which reached us only a short time ago, I feel some explanation is in order. I refer to the seventh paragraph on page 93 where the government organization to be



Multiple-part Red-Strand Slings handle heaviest loads, and are easy to apply to both the load and the crane hook. User tests in Detroit proved Red-Strand slings withstood unusual abuse, yet maintained higher-than-rated strength. A Gary plant uses Red-Strand single-part slings for many lifting jobs like this. These slings are available with various combinations of end fittings for attaching the sling to rings or lugs.



A heavy cylindrical load usually calls for multiple-part Red-Strand Flat-Laced slings. They are strong, flexible and do not slip or abrade.

How to Select the Correct Sling for Your Job

Start your sling selection by analyzing five factors:

1. The load—its size, weight, shape, finish.
2. Working area, amount of head room.
3. Size and type of crane hook.
4. Angle of sling legs.
5. Location and type of lugs or rings, if any.

From this information your supplier can recommend the sling by type, size and length that is safest, longest lasting and most economical for your job.

Types of Slings

Multiple-part slings are always recommended for heavy duty service, because for equal strength they are far more flexible than single-part slings. They hug the shape of the load easily, present a greater bearing surface to the load, and reduce the possibility of marring surfaces.

Where these factors are not so important, either Red-Strand *single-part slings* or *grommet slings* may be used for economy. Single-part Red-Strand slings are often recommended for lifting lighter weight objects, or those that have fixed attaching rings or lugs. Grommet, or continuous strand Red-Strand slings are ideal for forming hitches of various types without fittings.

When you re-use Pin-Lock thimbles you reduce sling costs by 21%

Extra Savings

Two suggestions will help you save money on slings.

The first is to re-use Pin-Lock thimbles on multiple part slings. These exclusive Leschen Pin-Lock thimbles cut sling costs on an average of 21% because they may be used again and again. They lock into sling loops with pins instead of permanent clamps, permitting re-use, and eliminating constant expense of thimble replacements.

The second suggestion is to use Red-Strand slings because they are made of *higher-than-rated* quality Leschen wire rope that delivers *longer-than-expected* service.

Get a copy of Leschen's *Sling Handbook* for complete information. Ask your Leschen man for one, or write.

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

KRALASTIC PIPE

RUSTPROOF · CORROSIONPROOF · LIGHTWEIGHT · TOUGH · SNAKEABLE

and it welds with a *brush!*

No need for expensive welding equipment—no time wasted—Kralastic pipe can be joined in *seconds* by *anyone!*

Just paint mating surfaces of Kralastic pipe and fitting with a special solvent or cement—slip them together and allow them time to set, and you have made a connection as durable as the pipe itself!

And Kralastic *is* durable!

It can't rust or rot, is permanently free of electrolytic corrosion. It's unharmed by soil acids, natural gas, most chemicals. And because it's one of the toughest of all plastic materials, it resists damage from tools, rocks, and rough handling.

What's more, Kralastic pipe is flexible enough to be snaked through many existing lines—to follow uneven ground contours without costly, job-prolonging fittings. And it's easily cut with an ordinary hacksaw.

This tough rubber-resin material—one of the first to produce successful plastic pipe—has proved itself not only in natural gas lines, oil field pipe, and valves of many kinds, but in hundreds of other *tough* applications as well.

Better investigate Kralastic® pipe and learn more of its *many* advantages. Write today to the address below.

50TH ANNIVERSARY 1904 1954 NAUGATUCK CHEMICAL

Naugatuck Chemical *Division of United States Rubber Company*

487 ELM STREET, NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario

formed to take over the activities performed by the M.T.A. (Turkish Minerals Institute) is presumed to possess preferential rights throughout the country in acquiring licenses. This is decidedly not so.

This body will have preferential right in areas like Raman and Garzan, where it is already producing oil, and like Resan, where it has built roads and has been drilling since the beginning of this year, almost 3 months before passage of the law.

This makes only three structures for the government-owned company, leaving more than 30 open to all qualified operators in the southern area indicated in my article of November 2, 1953, of The Oil and Gas Journal. Besides, there is Thrace, northern Turwey, Mut, Silifke, and Antalaya where an equal number of other structures exist which are equally open to those who wish to drill on them.

It can be stated that government-owned company will have no preference and the idea of monopoly is preposterous and definitely contrary to the spirit of the law.

Cevat E. Tasman,
Maden Tetkik ve Arama Institute,
Ankara, Turkey.

Canadian Gas for the United States

"The Canadian gas industry has come of age—tomorrow it starts treading the road to maturity.

"The theme of this meeting is 'Natural Gas for All Canada' and in that theme we are not forgetting certain sections of the United States of America, which we hope to supply. . ."

D. K. Yorath, past president of the Canadian Gas Association, in an address at the association's annual meeting in Banff, Alta.

A Banker's Look at Canada

"Since the discovery of the Leduc field in early 1947 followed by the Redwater field in mid-1948 — the world's largest discoveries in those 2 years — concerted efforts have been made to focus attention on the Canadian oil industry . . . There has been a tendency to over-glamorize the situation and to be extremely optimistic regarding individual instances and even excessively premature in some cases . . . Let us try to assess western Canadian oil in its proper perspective.

"One of the major problems facing the oil industry in Canada today is that of markets. . .

"It has been suggested that by 1958 Canada could be self-sufficient in oil. However, this appears to be an accounting concept only, for its realiza-

an ACCO product

Helicoid Gages

Flutter Won't Hurt Them!

HELICOID Gages are designed to withstand many millions of pressure pulsations. Flutter and rapid surges have no effect on their accurate performance in long-life service. Tests show 75,000,000 cycles at 1200 pulsations per minute without wear.

1. There are no gears to wear out

Only HELICOID Gages offer this long-lasting gage movement. There are no gears, no teeth to wear out. Cam wiping action keeps contact points clean and smooth.

2. Bourdon tubes won't stretch, leak or crack

Bourdon tubes in HELICOID Gages give maximum torque and minimum stress to promote greatest possible endurance life. Will withstand millions of pressure pulsations without stretching, leaking or cracking.

HELICOID Gages
for Pressure, Vacuum or Compound Service

There are HELICOID Gages for all pressure ranges —with white, black or radiant faces—wall, stem, flush and panel mountings for flangeless cases. See your distributor today or write for **Catalog G-2.**

ACCO

Helicoid Gage Division
AMERICAN CHAIN & CABLE

927 Connecticut Avenue • Bridgeport 2, Connecticut

Pressure • Vacuum • Compound

C R C A REVOLUTIONARY

FOR INTERNAL CLEANING . . .

LINE

The heart of the C-R-C internal cleaning and coating machine is this head which rotates at 250 rpm. The wire brushes clean the pipe and corrosion-resistant coating is sprayed from the guns at the left.

This over-all view shows the rotating head and the shaft which drives it through the pipe.

The rotating head enters the pipe after it has been clamped on the rack to begin the cleaning-coating operation.

This tractor drives the cleaning head through the pipe. Coating for the spray guns is in the tank in front of the operator.

Increased production through improved flow in your pipelines is now possible with the use of C-R-C's revolutionary new internal cleaning and painting machine. This new machine cleans the interior of the pipe and coats it in one automatic operation. Internal cleaning gives a smooth abrasion-resistant surface resulting in reduced turbulence and friction for substantially increased flow.

After the cleaning operation the machine coats the interior with a corrosion-resistant Epon* resin paint, developed in cooperation with Coast Paint & Lacquer Co., Inc. The unit is designed to provide pipe joints with this smooth interior surface and protective coating when they are received from the mill. Its use is also recommended on pipe that has been in storage for long periods to remove rust and corrosion before it is laid.

The new unit is an EXCLUSIVE* development of C-R-C. It is completely portable and can be used for stationary or on-the-job installations. The cleaned and coated, abrasion-resistant surface is desirable for use in gas pipelines as well as products and crude-oil lines. Consult C-R-C on this new pipeline development for improving production in your lines.

*Patent pending

C R C

CRUTCHER • ROLFS • CUMMINGS, INC.

7825 KATY ROAD, HOUSTON, TEXAS • TULSA, OKLAHOMA

C-R-C has been first with every major development in pipeline equipment

DEVELOPMENT AND COATING OF PIPE

A supply of 5-gallon cans of special "Copon" formulated for C-R-C pipe application.

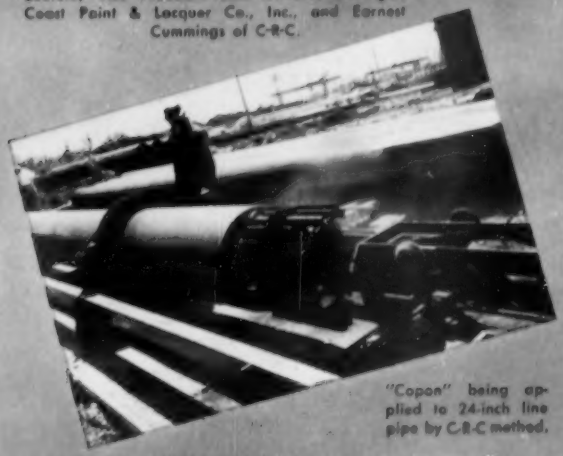
Left to right — Jim D. Cummings of C-R-C, Carl Seefeld, Vice President and General Manager, Coast Paint & Lacquer Co., Inc., and Earnest Cummings of C-R-C.

"COPON" . . . our Epon® *resin coating is used by C-R-C for protection and preservation of line pipe.*

Our chemists and engineers — working for weeks in close association with Mr. Jim Cummings — have developed and perfected the special "Copon" formula for the coating used in the revolutionary new C-R-C line pipe cleaning and coating process.

"Copon" adds years to the life and usefulness of line pipe.

- It assures installation of rust-free pipe.
- It has exceptional tenacity, will adhere to metal surfaces longer and under more difficult conditions than any other coating yet tested.
- It is abrasion-resistant and has proven low erosion rate.
- It gives positive protection against rust and corrosion, also the chemical effects of crude oil, natural gas and salt water.
- It has amazing flexibility and elasticity.
- It provides a silky smooth, even surface that increases line flow by reducing friction.



"Copon" being applied to 24-inch line pipe by C-R-C method.

Above the business end of C-R-C cleaner and "Copon" application.

COAST Paint & Lacquer Co. Inc.

P. O. Box 1113 Houston, Texas

Specializing in Protective Coatings and finishes for Industry

"Finest Thread Protection" means using either of these WECO Compounds. They both exceed the requirements for maximum thread protection . . . for minimizing galling . . . for sealing without freezing. WECO Compounds require no thinner, will not harden, are not affected by hot or cold weather.

Give your tool joints and drill collars the finest thread protection and they'll give you longer, better service.

NO-GALL 50% ZINC BASE

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tion depends on Canadian crude competing effectively with imported oil.

. . . However, the crude petroleum industry stands among the top ten in Canada. The whole picture may not seem too bright when viewed as a short-term 'bonanza,' but as a long-term proposition there is basis for considerable well-founded optimism. . ."

Article in the Commercial Letter, publication of the Canadian Bank of Commerce, Toronto.

Confident of Canada

"Will the expenditures (in western Canada) increase as time goes on? In all probability, yes. This year, the exploration outlay is running a million dollars a day, 10 per cent above last year. The geological possibilities of the west are still very scantily surveyed. As yet only one well for every 178 square miles of potentially productive land has been drilled as compared with one well for every 12 square miles of potential oil land in the United States.

"Without making any prediction as to when or by how much, I feel confident that further expansion in the oil industry can certainly take place."

J. R. White, president of Imperial Oil, Ltd., in an address at the Western Canada Trade Fair, Brandon, Man.

Conservation and Banking

"The astounding and continued growth of the Pacific Coast states has reached such proportions that the problem of the oil industry in California will be largely a question of meeting these expanding requirements rather than a problem of overproduction. As a result, proration, which is one of the basic tenets of conservation in the other producing states, is certainly not a determining factor in California at this time or the foreseeable future . . .

". . . The objectives of all conservation statutes are to protect the correlative rights of all owners and to obtain the greatest possible recovery of oil and gas or, stated negatively, to prevent waste in all its aspects. . .

". . . It was the adoption of conservation laws in other states that gave my bank the incentive and courage to embark on a larger scale of financing the independent oil producer. . .

". . . This concept has done much to bring the oil industry to its present high state of development, the preservation

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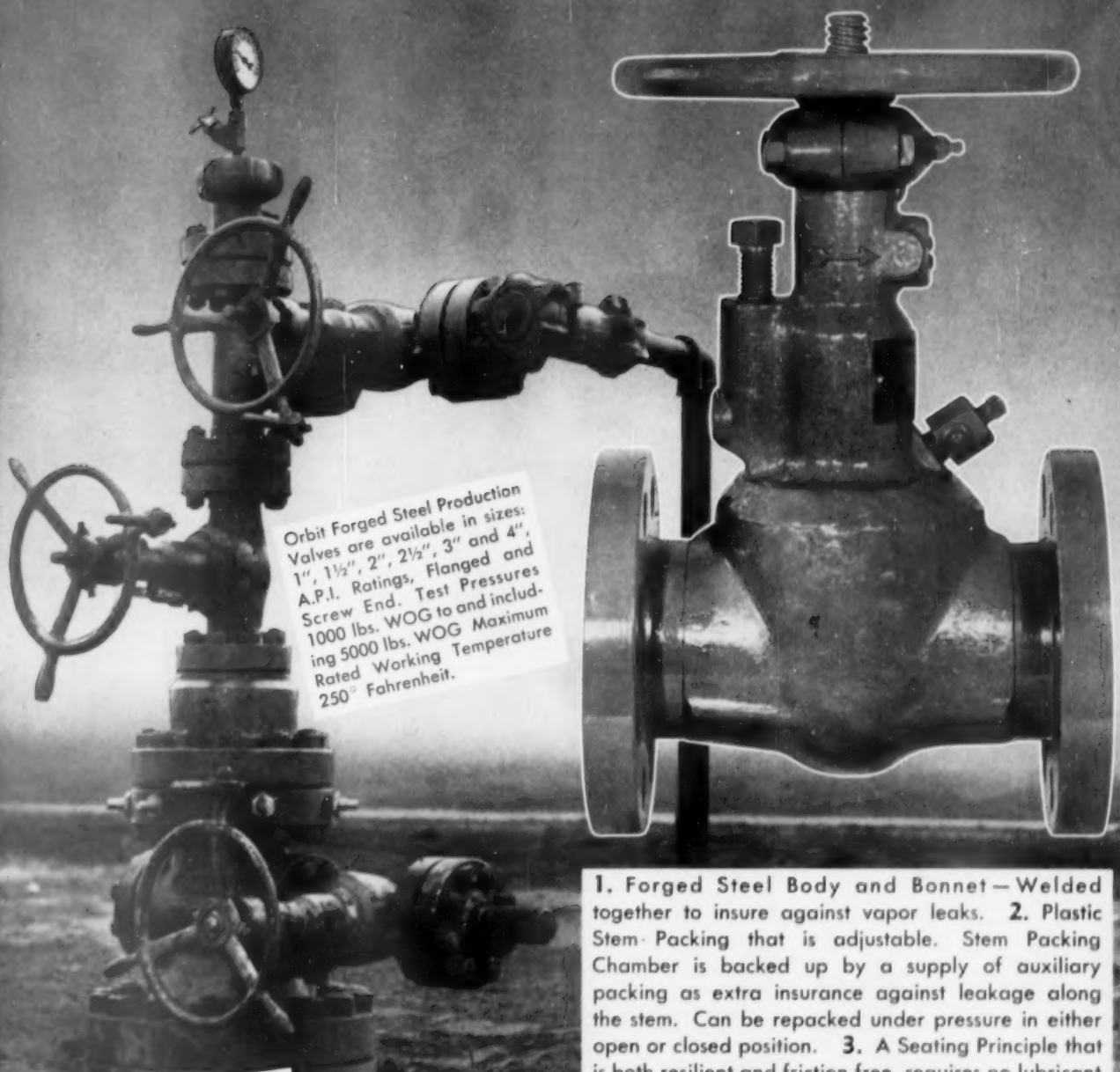

Orbit Forged Steel Production Valves are available in sizes: 1", 1½", 2", 2½", 3" and 4", A.P.I. Ratings, Flanged and Screw End. Test Pressures 1000 lbs. WOG to and including 5000 lbs. WOG Maximum Rated Working Temperature 250° Fahrenheit.

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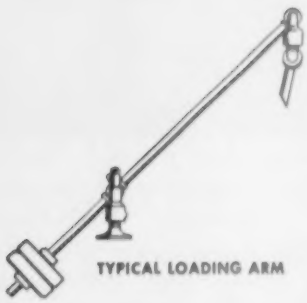
Schedule 40



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of which insures our national and industrial security."

Hugo A. Anderson, vice president of First National Bank of Chicago, in an address during a Los Angeles meeting of the Independent Bankers' Association of Southern California.

Who Said "Great Giveaway?"

"The striking thing about the tidelands activity is that it bears out full what the advocates of state tidelands ownership contended in their long fight in Congress. Settlement of the controversy over federal-state ownership, they said, would mean large-scale development of a great reserve of oil for the nation. In answer to assertions that state ownership would favor the big oil companies, they pointed out that only companies with great financial resources could stand the expense of tidelands oil operations, regardless of who owned the area.

. . . It was then predicted . . . that 85 per cent of the oil wealth of the Continental Shelf lies in the area owned by the federal Government—a complete refutation of claims that the tidelands settlement constituted a 'great giveaway' of wealth belonging to the nation."

Editorial in the Fort Worth Star-Telegram.

Congress—The Only Recourse

"They (independent producers) have tried first of all to find administrative relief. This is apparently impossible under the trade agreements program. . .

"The domestic oil industry has also sought to convince the major American oil importers of the necessity to directly reduce their imports. Only in the last month has there been any evidence whatsoever on their part of even a recognition of the need to cut back . . .

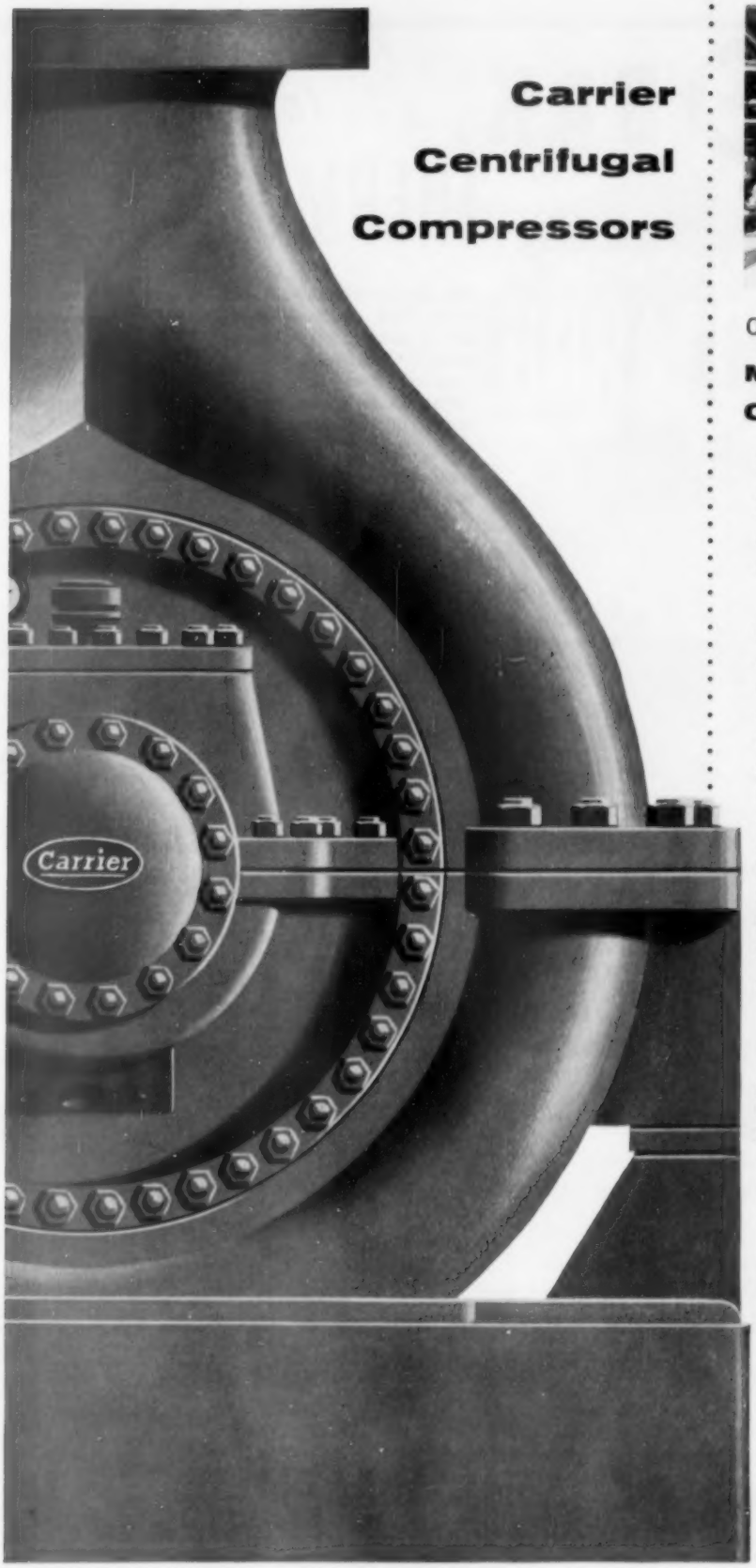
"Thus, administrative alternatives and voluntary reductions of oil imports have both failed. The domestic oil producers has recourse to only one other hope. That is the hope that Congress will see fit to correct this situation in the interests of national security . . ."

Representative Gavin of Pennsylvania in a speech before Congress.

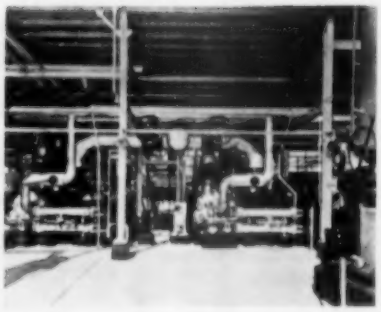
CALENDAR OF EVENTS

JULY

13-14 Western Plant Maintenance Conference, Ambassador Hotel, Los Angeles.
15 Southern Gas Association, conference on radio communications for pipelines. Adolphus Hotel, Dallas.
16 Southern Gas Association, dispatchers' conference, Adolphus Hotel, Dallas.



Carrier Centrifugal Compressors



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Magnolia Petroleum Company

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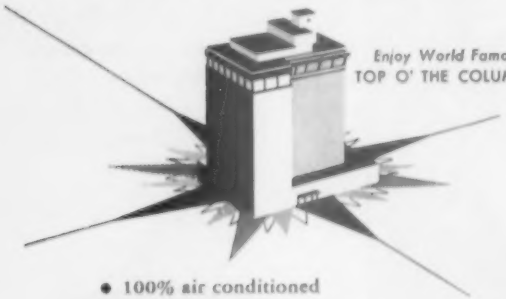

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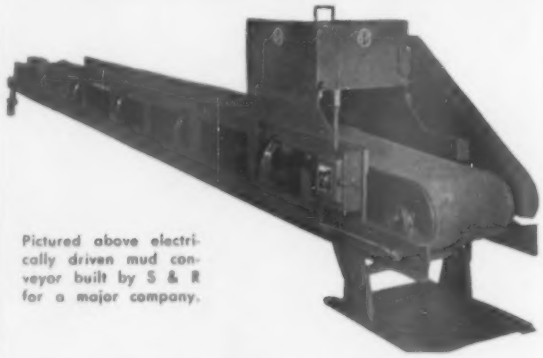

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29-31 Wyoming Geological Association, ninth annual field conference, Townsend Hotel, Casper.

AUGUST

13 Southern Gas Association, pipeline operations and engineering conference, Rice Hotel, Houston.

16-17 North Dakota Oil and Gas Association, second annual convention, Bismarck, N. D.

16-18 Society of Automotive Engineers, West Coast annual meeting, Statler Hotel, Los Angeles.

20 Southern Gas Association, conferences on natural-gas gathering and natural-gas processing, Captain Shreve Hotel, Shreveport.

23-25 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

26-28 (tentative) Intermountain Association of Petroleum Geologists, fifth annual field conference, beginning at Price, Utah.

27-28 Joint meeting, reserves committees of A.G.A., A.P.I., Canadian Petroleum Association, Banff, Canada.

SEPTEMBER

7-9 Association of Desk and Derrick Clubs of North America, annual convention, Banff Springs Hotel, Banff, Alta.

8-10 Pacific Coast Gas Association, sixty-first annual meeting, Vancouver Hotel, Vancouver, B. C.

9-11 Interstate Oil Compact Commission, Omaha, Neb.

10 Southern Gas Association, conference on compressor-station operation, Jung Hotel, New Orleans.

12-16 American Institute of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.

13-14 Independent Natural Gas Association of America, annual meeting, Roosevelt Hotel, New Orleans.

15-17 National Petroleum Association, fifty-second annual meeting, Traymore Hotel, Atlantic City, N. J.

16-17 Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.

17 Natural Gasoline Association of America, Oklahoma regional meeting, Skirvin Hotel, Oklahoma City.

23-24 Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.

27-28 Symposium on Methods for Testing Liquefied Petroleum Gases (ASTM D-2; ASTM D-3, CNGA & NGAA), Statler Hotel, St. Louis.

27-29 Electrical Conference for Petroleum Industry, American Institute of Electrical Engineers, Mayo Hotel, Tulsa.

27-30 Ninth Annual Petroleum Mechanical Engineering Conference, petroleum division of the American Society of Mechanical Engineers, Statler Hotel, Los Angeles.

28-29 Texas Mid-Continent Oil and Gas Association, Baker Hotel, Dallas, Tex.

30 Southern Gas Assoication, conference on transmission management, Shamrock Hotel, Houston.

OCTOBER

1 Southern Gas Association, conference on gas pipeline rights-of-way, Rice Hotel, Houston.

1-2 Standards Engineers Society, annual meeting, Haddon Hall, Atlantic City, N. J.

3-7 ASTM Committee D-2 on Petroleum

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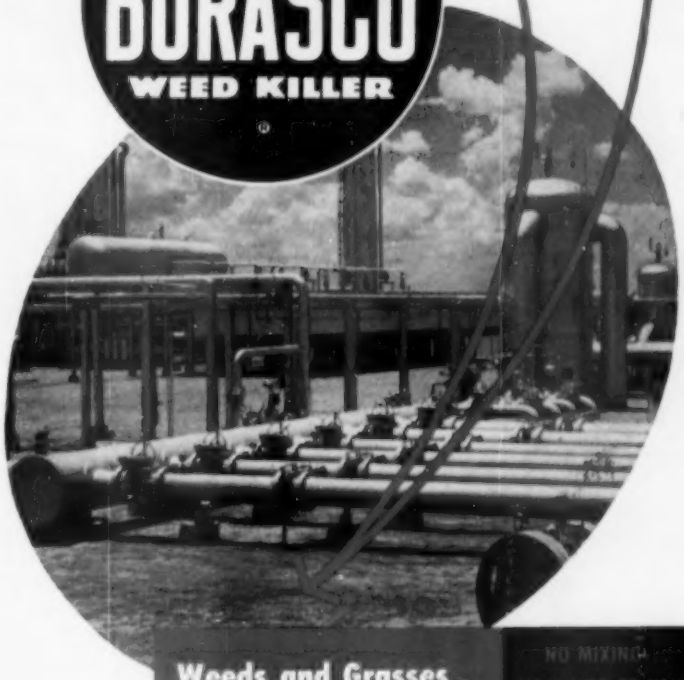

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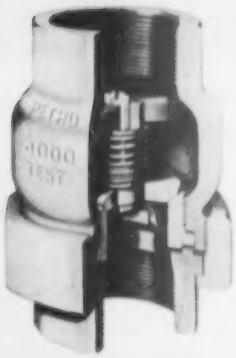

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4-6 **Texas Mid-Continent Oil and Gas Association, annual meeting, Plaza Hotel, San Antonio, Tex.**

4-6 Petroleum Electric Power Association, twenty-sixth anniversary meeting, Jung Hotel, New Orleans.

6-8 Eighteenth Technical Conference on Petroleum Production, Pennsylvania State University, State College, Pa.

7- 8 **California Natural Gasoline Association, twenty-ninth annual fall meeting, Ambassador Hotel, Los Angeles.**

7-8 American Institute of Mining and Mettallurgical Engineers, Pacific Petroleum chapter, fall meeting, Biltmore Hotel, Los Angeles.

10-13 American Association of Oilwell Drilling Contractors, fourteenth annual meeting, Biltmore Hotel, Los Angeles.

11-13 **American Gas Association, annual convention, Atlantic City, N. J.**

12-15 **Eighth National Chemical Exposition, Chicago Coliseum, Chicago.**

14-17 Permian Basin Oil Show, Odessa, Tex.

17-20 American Institute of Mining and Metallurgical Engineers, petroleum division, fall meeting, Plaza Hotel, San Antonio.

21-22 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.

24-26 **Independent Petroleum Association of America, annual membership meeting, Mayo Hotel, Tulsa.**

25-27 National Lubricating Grease Institute, annual meeting, Mark Hopkins Hotel, San Francisco.

26-28 Society of Automotive Engineers, **national diesel engine meeting, Statler Hotel, Cleveland.**

29 Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.

NOVEMBER

1-3 Geological Society of America, annual meeting, Statler Hotel, Los Angeles.

3-5 Gulf Coast Association of Geological Societies, fourth annual meeting, Rice Hotel, Houston.

4-5 **Society of Automotive Engineers, national fuels and lubricants meeting. Mayo Hotel, Tulsa.**

5 Southern Gas Association, conference on field production of natural gas, Herring Hotel, Amarillo.

8-11 **American Petroleum Institute, thirty-fourth annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.**

11-12 American Association of Petroleum Geologists, Pacific section annual meeting, Biltmore Hotel, Los Angeles.

17-18 North Texas Section, American Institute of Mining and Metallurgical Engineers, and Production Committee of the North Texas Oil and Gas Association, symposium on secondary recovery, Wichita Falls, Tex.

28-Dec. 3 **American Society of Mechanical Engineers, Statler Hotel, New York.**

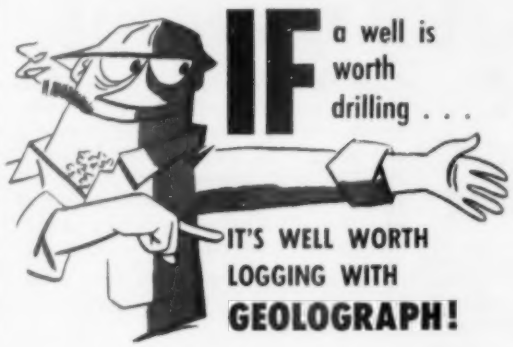
DECEMBER

2-4 Interstate Oil Compact Commission, **winter meeting, Drake Hotel, Chicago.**

2-4 **American Chemical Society, Southwest Regional meeting, Fort Worth, Tex.**

3 Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.

12-15 American Institute of Chemical Engineers, annual meeting, Statler Hotel, New York.



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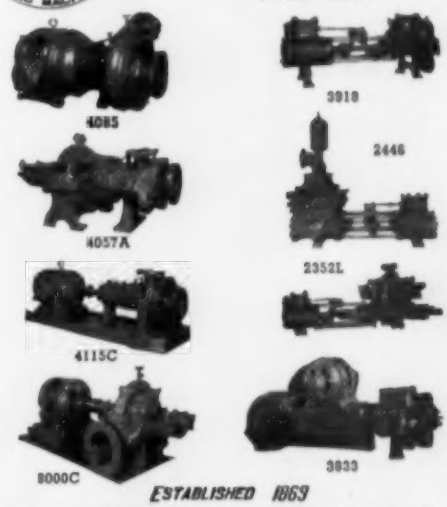

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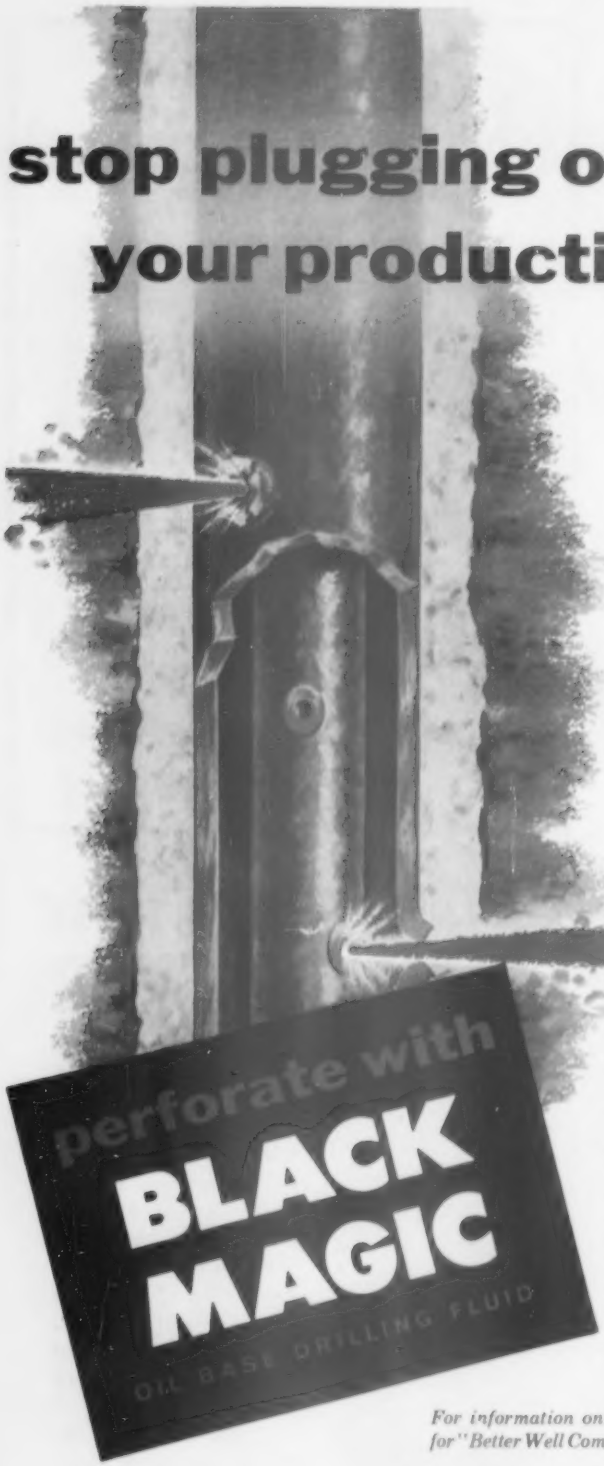

Experimental tests backed up by actual field data prove conclusively that when perforating is performed in the presence of clay-water muds, mud particles are forced into the newly opened shot-holes where they are compacted by pressure and baked by excessive heat to form a solid plug that immediately seals the hole.

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> *"The shot hole made by each of the guns used in these tests was filled with a plug which was not removed by back-flowing . . . the plug formed in the bullet perforation is relatively hard and dense. The plugs in the jet perforations also contain sand and mud solids, but, in addition, include a relatively large quantity of debris from the shaped charges . . . (which) makes up the bottom portion of an extremely hard, dense plug."*
>
> *(Effectiveness of Gun Perforating, Journal of Petroleum Technology, January, 1954.)*

During these tests, made with commercially available guns of both types, flow rates through the plugged holes averaged 50.8% less than could normally be expected without plugging. Reduction in flow reached as high as 78% in individual cases.

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Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1954 by The Petroleum Publishing Co.

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JOURNALLY Speaking

Modern Exodus

IN the exploration end of the oil business, oil men and their families are accustomed to moving from one place to another frequently and suddenly, and to making new homes in all sorts of out-of-the-way places. Not so in the refining end of the business, generally speaking. Certainly it wasn't true of the workers in the Socony-Vacuum refinery in Olean, N. Y., most of whom had lived in that small upstate town all their lives.

So when Socony announced that it was closing down that plant but would transfer any or all workers to the new General Petroleum refinery at Ferndale, Wash., there was consternation. What are conditions like in that strange and faraway land on Puget Sound? they asked. Is life tolerable there? Dare we take our children?

But they took a leaf from the Book of Exodus and, like the Children of Israel in search of the Promised Land, they elected a party of spies to go ahead and case the joint. Five employes and their wives were chosen to make the long and hazardous journey (via DC-6) at company expense. And, like Caleb and Joshua, they returned with the report that the Promised Land was flowing with milk and honey (or their equivalents in modern living standards).

The residents of the little town of Ferndale and of nearby larger Bellingham rolled out the red carpet for them and told them everything. The quizzing the scouts got on their return provided information the company never would have thought of providing — grocery-store prices, amount of homework the schools assign, clothing styles, fishing spots, music teachers, baby doctors, hayfever conditions, important details like that. All in all, the emissaries' report indicated that Washington wasn't nearly as wild and woolly as they had feared.

As we recall our Bible history, the Israelites didn't trust the report of their scouts and wandered in the desert 40 years before getting up enough gumption to cross over into the Land of Canaan, but we understand that quite a few of the Olean folk are preparing to move with hardly any trepidation at all.

Three Stars

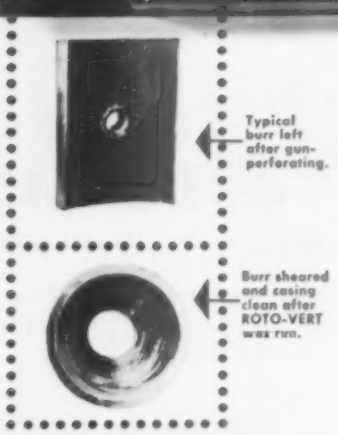
WE have just read a book by a friend about a friend, a history of conservation made by a friend of conservation: "Three Stars for the Colonel." As everyone in the oil industry knows, "The Colonel" could, of course, be nobody but Ernest O. Thompson, who has been a member of the Texas Railroad Commission for a quarter of a century.

That quarter century, which started with the discovery of the wild-running East Texas field, brought about legal acceptance of scientific methods of oil and gas conservation, and the colonel was in the thick of every one of the hundreds of battles that were involved in the process. The book calls him the father of petroleum conservation, and we don't know of anyone who could challenge the title.

Most histories of conservation feature either the legal or the engineering aspects, but this one deals with the personalities, the human relations, and the politics involved. It makes a fascinating story. On first thought we had the feeling that the book portrayed the colonel as a remarkably brilliant, talented, far-sighted, sharp-witted, hard-fighting public servant. On second thought we decided that he is.

But there's one thing that the author, James A. Clark, left out. Being a veteran Texas newspaperman and oil writer, Jim of course knew that one secret of the colonel's success was his ability to get a "good press." He's always good "copy," and he's a reporter's dream. He never misses a chance to talk with newsmen, never gets irked at the most impertinent questions, and always gives the boys a quote worth printing. It's a practice that could well be emulated by quite a few public figures we could name. Oil writers gave the colonel three stars long before the Army did.

—Henry D. Ralph



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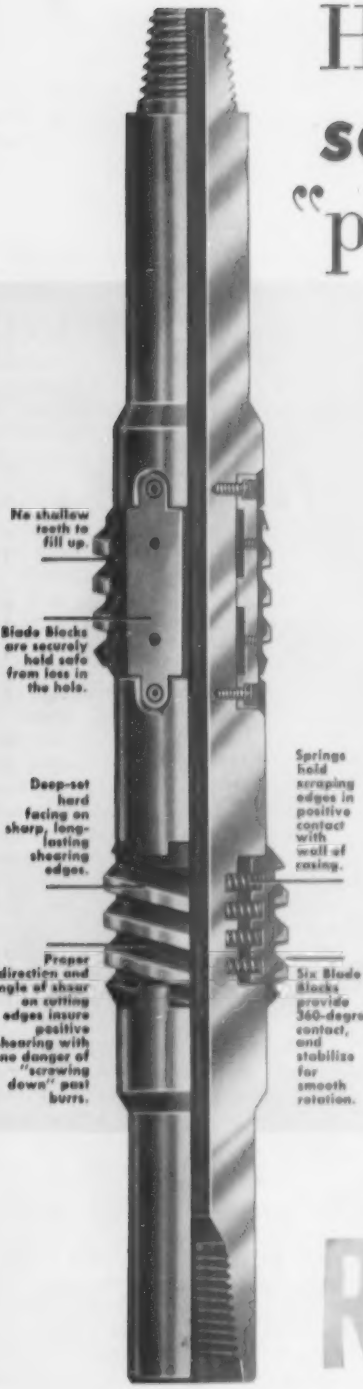
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The gas escalator can't be reversed

GOVERNMENT theorists and political opportunists again are attempting to set aside the laws of supply and demand in the gas business, this time through the medium of the Federal Power Commission's investigation of escalator clauses in gas-dedication contracts.

On its face, the investigation is innocent and proper—a factual study of contract terms and their effects on all branches of the industry. But there is adequate reason to believe that interests which have a political stake in holding field prices to an artificially low level will try to shape the investigation to that end.

A PHENOMENON OF THE GAS BUSINESS during the last 3 or 4 years is the almost universal adoption of flexible price provisions in sales of gas reserves to pipelines. Producers rebelled against dedicating their gas for long periods at a flat price—partly in fear of monetary inflation but more in the knowledge that gas would be worth more later.

So the only way new lines could get long-term reserves was to offer a flexible price, usually starting considerably higher than the field prices of older lines. Then the producers under older, flat contracts kicked up such a fuss over this inequity that many pipelines voluntarily revised old contracts to conform with the trend.

There are many forms of flexible provisions. Some are tied to a general price index, or provide automatic escalation of, say, a cent every 5 years. Some permit periodic renegotiation to meet average regional prices. Then there is the quaintly named "most favored nation" clause under which the buyer raises all old prices to the level of his most recent contract.

The long-range effect of such provisions is to bring all field prices to a more or less uniform level in a given producing area, with ceilings fixed by the economic value of the gas in distant markets. The immediate result has been a spurt in gas prices which has alarmed some consumers.

THE WORDING OF FPC's ANNOUNCEMENT of the investigation implies a threat to disallow any prices escalated above the starting rate. If this is done it will effectively stop expansion of the gas-transmission industry and might void existing contracts, thus leaving present lines without reserves.

The alternative to escalation is short-term contracts, because most producers simply won't accept a flat price for 20 years—except at much higher rates than are now offered. And a pipeline can't get financing or develop markets without long-term reserves.

The industry ought to be able to demonstrate this during the investigation. If it doesn't, all concerned—especially gas consumers—are going to be in for a very rough time.

FIXAFRAC SEALED UNPRODUCTIVE ZONE TO MAKE ACIDIZING EFFECTIVE

Temporary plugging service by DOWELL helped increase production from 0 to 188 BOPD

A new well in a limestone formation failed to produce oil in commercial quantities even after an acidizing treatment.

Dowell engineers, called on the job, recommended and performed a second acid treatment, using a Fixafrac* temporary plug ahead of the acid. Following the treatment, the well flowed 188 barrels of oil per day.

Fixafrac—exclusive with Dowell—is used to prevent the entry of acidizing and fracturing fluids into unproductive, depleted, or previously treated zones of the pay formation. The material used carries suspended solids which react after a short time causing the Fixafrac to liquefy and flow back freely to the well bore.

Dowell engineers perform these treatments using the latest techniques, modern tools and high-pressure, high-volume equipment.

For more information about Fixafrac or any of the many Dowell oil field services, call Dowell today or write DOWELL INCORPORATED, Tulsa 1, Oklahoma, Dept. G-11.

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THIS WEEK . . . . . IN THE NEWS

INTERNATIONAL—Jersey Standard abandons production in Italy after 22 years due to law favoring state-controlled companies. . . . Refining and marketing facilities will be maintained. . . . ¶A big stride toward settlement of Iranian situation is made as membership of management board is settled. . . . Iran will be represented by two members, the consortium by five. . . . Production rate is next major problem to tackle. . . . ¶Gas reserves in Venezuela show increase in 1953 after 6 years of deficits. . . . ¶Turkish official gives assurance that foreign companies will get opportunity to bid for choice acreages in Turkey. . . .

THIS SCENIC NIGHT VIEW SHOWS Continental Oil Co.'s expanded refinery at Lake Charles—a plant that has grown 4½ times its original size to the present capacity of 45,000 bbl. per stream day. Among the new equipment that has been added in the latest expansion are two new Thermofor catalytic cracking units. Details of the expansion and modernization are told on page 83.

PIPELINES—Minnesota Pipe Line Co. lets contract for 260-mile, 16-in. crude line to Williams Brothers. . . . Line will be southern segment of system to bring Fosterton, Sask., crude to Twin Cities-Chicago area. . . . Southern Saskatchewan Pipe Line will let contract for its part of system soon. . . . ¶Magnolia completes welding on 20-in. crude line from Corsicana to Beaumont and begins water testing. . . . Company expects to move oil through line by August 1. . . . ¶North Dakota court will hear motion to dismiss appeals from Public Service Commission order granting North Dakota Natural Gas Transmission conditional approval for line. . . . Commission will hear rival application of Northern Natural next month. . . .

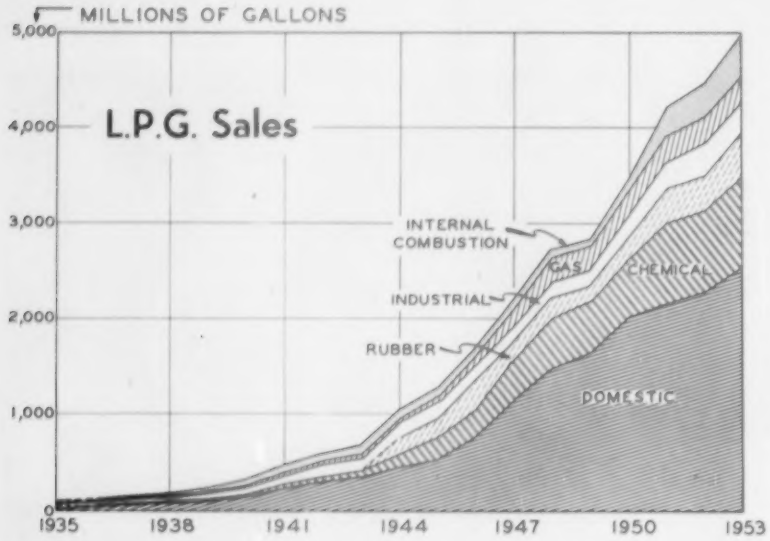
NATURAL GAS—American Gas Association estimates natural-gas industry will spend $3.5 billion on construction of new facilities by 1957. . . . This compares with $4.6 billion spent in 1950-53 period. . . . Expenditure for 1954 will be $1.1 billion and $1.05 billion in 1955, dropping to estimated $750 million for 1956 and 1957. . . . ¶Motion for stay filed by Dan Moody of Texas in Supreme Court halts mandate of court in Phillips gas decision. . . .

GOVERNMENT—Government invites nominations for areas on Continental Shelf off Texas and Louisiana for sulfur lease bidding. . . . Leases for sulfur will be separated from oil and gas leases. . . . Holder of oil and gas lease must offer competitive bid for sulfur lease if sulfur is in same area as oil and gas. . . . ¶Interior Department revamps OGD organization in line with $50,000 cut in appropriations for current fiscal year. . . . ¶House and Senate both approve legislation authorizing "trade in" as incentive to construction of new, fast tankers. . . . ¶Senate interstate commerce committee approves nomination of Frederick K. Stueck as member of Federal Power Commission without opposition.

INDUSTRY—Dorchester Corp. buys large gas holdings in Panhandle and Hugoton fields from Panoma Corp. in $118,500,000 deal. . . . Purchase includes 218 net wells and two natural-gasoline plants. . . . ¶New firm, Texas Butadiene & Chemical Corp., organized to build butadiene and alkylation plant on Gulf Coast. . . . Decision to build not final. . . . Proposed site not disclosed. . . . ¶United States leadership in ownership of tankers is dwindling as foreign construction increases. . . . U. S. now owns only 26 per cent carrying capacity of world's ocean-going fleet compared to 60 per cent immediately after World War II.

EXPLORATION—Western Canada comes up with four wildcats, one in each of the oil-producing provinces. . . . Tests are being conducted on oil discoveries in British Columbia and Manitoba, while gas has been indicated in Saskatchewan and Alberta wells. . . . ¶Gulf Oil has entered scramble for oil off Texas coast and is reported drilling below 535 ft. on wildcat located in high-priced block off Mustang Island. . . . ¶Stanotex is continuing tests on discovery off Padre Island. . . .

PRODUCTION—Railroad Commission approves unitization and pressure-maintenance program for Bend section of Parks field in Midland County, Texas. . . . Program is expected to recover an additional 7,500,000 to 22,500,000 bbl. of oil. . . . Project is second large program approved by Commission for Midland County in 2 months. . . . ¶First large-scale cooperative water flood in California gets under way at Dominguez field. . . . Union Oil, Shell, and Dominguez Oil are injecting by five injection wells and expect to add another 12 within a month. . . . Program started after 2 years of pilot tests. . . .



What's happening to . . .

. . . Natural-Gas Liquids

THE expansion of new and old markets for natural gasoline, liquefied petroleum gases and related products is the only long-range answer to the current problem of excess supplies—not reduction of supplies, large storage programs or new blending methods.

This appears to be the consensus of opinion of economists who are giving special consideration to the problem of rapid expansion in the output of natural gasoline and natural-gas liquids. It is a problem affecting the entire oil industry adversely.

The production of natural-gas liquids continues to increase this year despite curtailment in crude-oil production and crude runs to stills at refineries. There is agreement that this upward trend will continue indefinitely.

Output of natural-gas liquids totaled 82,042,000 bbl. (684,000 bbl. daily) the first 4 months of this year. This is a gain of 4 per cent over the same period last year despite the fact that crude-oil production decreased 1.3 per cent along with a small reduction in crude runs to stills. Eighty-seven per cent of the natural-gas liquids this year came from field plants and the remainder from refineries.

The postwar trend is reflected in the government figures which show that while crude-oil production has increased 35 per cent since 1946, the gain in natural-gas liquids has been 115 per cent. Application of conservation practices, better recovery methods at field plants, new refinery processing and growth in natural-gas output, are all factors in the amazing increase in natural-gas liquids.

More outlets needed . . . Most analysts emphasize the possibilities of additional markets for all or part of the natural-gas liquids as the only basic solution to the problem of excess supplies with which the natural-gasoline manufacturers have often been confronted from the time the first product was manufactured commercially nearly 50 years ago.

At present Grade 26-70 natural gasoline is selling for 4½ cents per gallon f.o.b. Oklahoma (Group 3) and ½ cent lower in North Texas. The low vapor pressure naturals bring slightly higher prices with correspondingly reduced yields. Butane and propane is bringing 2 to 3 cents per gallon in the Southwest where outlets are available and a substantial part of the current output is now going to underground storage for fall and winter consumption. These prices are all far below the prices for crude oils at the wells and most refinery products with which natural-gas liquids compete in markets, directly or indirectly.

The statistical situation for light products is not satisfactory from the sellers' viewpoint and the outlook for the balance of the year is not considered favorable.

Motor fuel the answer? . . . Because of satisfactory results obtained by users at scattered points throughout the United States many market students are enthusiastic about the use of propane as motor fuel. They feel that it is

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THERE appears to be no quick and lasting solution to the problem of excess supplies of natural gasoline, liquefied petroleum gases and related natural-gas liquids. This weakness is a bearish factor in all petroleum markets.

There is no feasible method of curtailing supplies in line with needs. Further increases in output from natural gasoline, cycling plants and refineries are in prospect.

Natural gasoline's low octane value makes it less attractive as motor fuel blending material as more refiners obtain volatility requirements from their own operations. Some refiners are now regular sellers of natural gasoline and L.P.G.

Further refining of natural gasoline and L.P.G. through reforming and other operations is not yet economic except in specialized situations.

Light products transportation in crude or products lines is attractive and will be extended. This tends to reduce costs and expand markets.

Underground storage is increasing rapidly and helps span wide seasonal differences in consumption. Analysts point out, however, new storage programs are no general panacea marketwise as long as there is a yearly excess of production.

L.P.G. outlets are expanding—but not as fast as supply. More use of propane, and possibly other light hydrocarbons as motor fuel, has further potential as serving facilities are made available.

J. A. LaFortune's plan to encourage large producers to absorb greater quantities of natural-gas liquids in their own refining and marketing operations receives support. This assumes companies will move their products by pipeline and dispose of them within their own operations.

one of the most promising outlets for an important part of natural-gas liquids.

Propane is being used satisfactorily in trucks, tractors, buses and other commercial vehicles with a wide sale as fuel for stationary engines. As a motor fuel it has an octane equivalent of 110 with low motor fuel consumption and low engine maintenance costs.

Because of high vapor pressure—approximately 200 psi.—the product cannot be dispensed at the conventional type filling station. This fact more than any other has tended to slow down a more rapid acceptance of propane as motor fuel.

Propane service station . . . Phillips Petroleum Co., the largest manufacturer and marketer of natural gasoline, is solving this problem with equipment designed to service all types of consumers. The pumps as shown in the accompanying photograph are skid-mounted with high pressure storage tanks and equipment is moved and operated wherever it will best serve the customer.

The company now has units of this equipment on some of the main highways for all classes of customers in several states of its marketing territory in the Southwest, Middle West, and South.

The potentialities of this market far exceed the supply of propane currently available for this purpose. It is estimated that trucks, tractors, buses, and other commercial vehicles consume in excess of 500,000 bbl. of motor fuel daily or approximately twice the present output of propane and propane-butane mixtures. The present consumption of propane as motor fuel is around 35,000 bbl. daily.

Investigators are in agreement that should adequate service station facilities be established along the main highways, including transcontinental systems, there would be quick conversions to propane as motor fuel by many fleet and small operators of trucks and buses.

Should the servicing facilities be available and the business established it would be possible to use mixtures of butane and propane as fuel and possibly other light hydrocarbons.

Near term remedy . . . As a possible amelioration for current conditions there is considerable support within the natural-gasoline industry for the plan of J. A. LaFortune, recent deputy petroleum administrator for defense and for many years an official of the Warren Petroleum Corp.

The LaFortune plan seeks to secure the cooperation of a number of major producing companies to the end that they will absorb, in their own operations, greater quantities of their own natural-gas liquid production. Some of these companies have always sold part or all their output to marketing organizations and part of these sales find their way to open markets where they become a bearish factor in an already weak situation.

LaFortune feels that much can be accomplished in stabilizing market conditions if these companies will transport the output of their gasoline plants—preferably by pipeline—to their refineries for blending for final sale or use. Should the companies not be able to find ready outlets for all of their output it is recommended that they use the excess as plant fuel or in some other manner regardless of the immediate return involved.

LaFortune estimates that if 20,000 to 25,000 bbl. daily of natural-gas liquid were absorbed in this manner the entire natural gasoline and L.P.G. markets would be relieved of much of their excess material east of California.

PROPANE SERVICE STATION for trucks, buses, and other commercial vehicles has been established by Phillips Petroleum Co. on the Turner Turnpike between Oklahoma City and Tulsa. The company is installing similar stations in several states of its marketing territory.

Key Pipeline Job Let

Williams Brothers will build 260-mile, 16-in. crude line scheduled to link Great Northern with outlet from Canada

HOUSTON. — Minnesota Pipe Line Co. of Houston has awarded contract to Williams Brothers Co. of Tulsa for construction of a 260-mile, 16-in. crude line from Clearbrook to Hastings, Minn. It will be the southern segment of a system that will move Canadian crude to the Twin Cities-Chicago market areas.

Marlin E. Sandlin, president of the pipeline company, said the $12,500,000 line will tie in with Lakehead pipeline near Clearbrook and with Great Northern Oil Co.'s new tank farm near Hastings.

Sandlin said construction schedules call for completion of the system by July 15, 1955. The system includes the present Interprovincial pipeline and Lakehead pipeline, the Hastings-Clearbrook line, and 155-mile, 16-in. line Southern Saskatchewan Pipe Line Co., Ltd., plans from the Fosterton area of Saskatchewan to Interprovincial's system at Regina.

Other contract near . . . Contract for the Southern Saskatchewan line will be let soon in Billings, Mont. This company is owned 50 per cent by Socony-Vacuum Oil Co. of Canada, Ltd., 30 per cent by Woodley Petroleum Canadian Oil Co., and 20 per cent by Southern Production Co.

Minnesota Pipe Line is owned 40 per cent by Woodley Petroleum Co., 40 per cent by Southern Production, and 20 per cent by J. Howard Marshall, vice president of Signal Oil Co., Fort Worth.

Principal user of the new pipeline initially will be Great Northern, which is building a 25,000-bbl. refinery in the Minneapolis-St. Paul area. The refinery will process medium-gravity crudes

from the Fosterton area. The refinery will go on stream in late 1955.

Minnesota Pipe Line said that Great Northern has contracted to buy the crude at the well head from Socony-Vacuum Oil Co. of Canada, Ltd., Woodley Canadian Oil, and Southern Production.

Refinery plans . . . Great Northern expects to start shipping at least 15,000 bbl. daily of the Fosterton-type crude through the new pipeline facilities by June 1, 1955, and to increase shipments to 20,000 bbl. daily by January 1, 1956. Total initial capacity of the Clearbrook Hastings link will be 35,000 bbl. of this crude daily.

Construction plans . . . Two pumping stations are planned on the Clearbrook-Hastings link. One will be located at the Clearbrook terminal take-off point and the other at a half-way point.

The turn-key contract with Williams Brothers calls for engineering, surveying, purchase of right-of-way and materials, and construction of the line and pump stations. Each of the stations will have three 500-hp. electric centrifugal units.

Two right-of-way gangs are in the field and pipe laying will start between August 5 and 10. There will be two mainline spreads — one going from Hastings and the other from Clearbrook.

Personnel . . . For Williams Brothers, the coordinator in Tulsa is Vincent E. Butler and the superintendent in the field is George Littlejohn. Field offices will be set up at either Little Falls or St. Cloud, Minn.

Project engineer for the new pipeline will be Ross Holmes, of Southern Production Co.'s staff. Oscar Wolfe, recently retired from The Texas Co., will serve as consulting engineer.

Directors of Minnesota Pipe Line include: J. R. Parten, chairman of the board and also president of Woodley Petroleum Co.; C. T. Chenery, chairman of the board of Southern Production; Roy C. Williamson, president of Southern Production; T. J. Snyder, Jr., vice president of Southern Production; Sandlin, vice president of Woodley Petroleum; J. B. Cook, secretary-treasurer of Woodley Petroleum; and Marshall.

H. C. HARRIS, JR.

J. E. HOLM

CARLE F. SHARP

NILES B. WINTER

Atlantic Decentralizes Production Setup

DALLAS.—Atlantic Refining Co. has announced a sweeping geographical decentralization of its domestic crude-oil production department headquartered here.

Operations of this department, which takes in all exploration, land, and production activities, will be carried on in five regions over the United States—Gulf Coast, West Texas-New Mexico, Oklahoma-Kansas, Rocky Mountain-Williston basin, and Dallas-Eastern. A regional manager has been appointed for each of these areas. Each manager will be responsible for finding and producing oil and gas in his assigned area.

The big change in the Atlantic operating setup was announced by J. N. Mendenhall, general manager in Dallas. It resulted, as Mendenhall put it, after the company decided "the best interests of the department would be served by geographical decentralization of the responsibility for finding and producing oil and gas."

Atlantic will continue to have heads of exploration, production, land, etc., in Dallas. They will be charged with planning over-all activities or programs within their fields. Carrying out of these programs, however, will be the responsibility of the regional managers.

A description of the new setup by regions follows:

. . . Gulf Coast: The new manager is Carle F. Sharpe. The region takes in South Louisiana, South and Southwest Texas, and the area off the coasts of Louisiana and Texas. Sharpe was manager of the land division in Dallas before the change. He is being replaced as manager of the land division by John Marston, who has been manager of the operations division in Dallas.

. . . West Texas-New Mexico: Activities will be directed out of Midland by Niles B. Winter. This is less of a switch than some of the others since Winter has been head of Atlantic's West Texas-New Mexico organization since 1948.

. . . Oklahoma-Kansas: J. E. Holm, in charge of the firm's Oklahoma-Kansas operations since 1917, is the manager. This region takes in northern Arkansas as well as Oklahoma and Kansas. Headquarters will be at Tulsa. Assigned to this region as assistant manager is Louis F. Davis, who has been general production superintendent in Dallas since 1951.

. . . Rocky Mountain-Williston basin: New manager is Robert T. Cox, formerly exploration supervisor for West Texas.

. . . Dallas-Eastern: This region takes in northeastern Texas, southern Arkansas, northern Louisiana, Mississippi, and Alabama. Heading it up will be H. C. Harris, Jr., who has been administrative assistant to the general manager in Dallas since 1946.

Another important change was the appointment of T. C. Frick as manager of the production division in Dallas. He formerly was regional coordinating manager for Southwest Texas region.

Edgar Kraus remains as manager of domestic exploration division in Dallas.

M. E. MONTROSE

RODNEY S. DURKEE

Critical Needs Mapped

Equipment men hear government official outline program designed for wartime; Durkee elected new P.E.S.A. head

MURRAY BAY, Que. — The United States Government recognizes the need for a steady flow of oil field machinery and equipment in wartime and it needs help from the industry to insure an adequate supply of critical materials, the Petroleum Equipment Suppliers Association was told here.

Rodney S. Durkee, president of Lane-Wells Co., Los Angeles, was elected president of the association for the coming year, succeeding Davis D. Bovaird of Tulsa, president of Bovaird Supply Co. M. E. Montrose, vice president of Hughes Tool Co., Houston, was elected vice president.

The big topic at the nineteenth annual convention of P.E.S.A. was the equipment industry's new relationship with the Government and the recent Washington conference with Commerce Secretary Sinclair Weeks on the part the industry will play in setting up a program for wartime.

Dealings of the equipment industry and Government have recently been transferred from the Interior Department to the Department of Commerce and a new unit of the Business and Defense Services Administration called the Agricultural, Construction, Mining, and Oil Field Equipment Division has been set up to handle requirements. John F. Skillman, director of the new unit, was one of the principal speakers at the P.E.S.A. convention and explained in detail the new setup.

Skillman explained to the oil equipment manufacturers the type of information the Government will need periodically from them in order to properly assess the material requirements and insure a ready program.

Newly elected directors of the association for the year 1954-1955 were elected, as follows:

... Directors at large: Mason B. Jones, S. M. Jones Co., Toledo; J. A. Crawford, Youngstown Steel Products Co., Los Angeles; E. S. Dulin, Byron Jackson Co., Los Angeles; Fred M. Mayer, Continental Supply Co., Dallas; Wallace D. Wilson, Wilson Supply Co., Houston; M. E. Montrose, Hughes Tool Co., Houston; and Guy A. Tompson, Bethlehem Supply Co., Tulsa.

... Directors for Eastern district include: Karl Elliott, Acme Fishing Tool Co., Parkersburg, W. Va.; Jene Harper, Franklin Supply Co., Chicago; Lloyd Lanphere, Ajax Iron Works, Corry, Pa.; A. S. Knowles, Parkersburg Rig & Reel Co., Parkersburg, W. Va.; Donald W. Mackie, Jr., Bradford Supply Co., Bradford, Pa.; Frederick F. Murray, Oil Well Supply Division, Dallas; A. W. McKinney, National Supply Co., Pittsburgh, Pa.; J. B. O'Connor, Ideco Division of Dresser Equipment Co., Dallas; Paul Scherf, Altens Foundry & Machine Works, Inc., Lancaster, Ohio; Ferd J. Spang, Spang & Co., Butler, Pa.; H. Bernard Wehrle, McJunkin Corp., Charleston, W. Va.; and John Seiler, Tube Turns, Inc., Louisville, Ky.

... Directors for Pacific district include: Frank E. Bernsen, Lucey Products Corp., Tulsa; E. C. Bolger, W. C. Norris, Manufacturer, Tulsa; Davis D. Bovaird, The Bovaird Supply Co., Tulsa; Rainey Elliott, Jones & Laughlin Steel Corp., Tulsa; Grover Kilgore, Halliburton Oil Well Cementing Co., Duncan, Okla.; W. H. Larkin, Larkin Packer Co., St. Louis; M. G. McCool, American Iron & Machine Works Co., Oklahoma City; Walter O'Bannon, Jr., Walter O'Bannon Co., Tulsa; John G. Staudt, Dowell Incorporated, Tulsa; S. P. Wallace, Maloney-Crawford Tank & Manufacturing Co., Tulsa; J. E. Webb, Republic Supply Co., Oklahoma City; and Carl White, Jr., Franks Manufacturing Corp., Tulsa.

... Directors for Southwestern district include: W. T. Campbell, Mission Manufacturing Co., Houston; Ken W. Davis, Mid-Continent Supply Co., Fort Worth; R. G. Hamaker, Reed Roller Bit Co., Houston; H. A. Helms, Cameron Iron Works, Houston; Frank L. Hereford, Murray-Brooks, Inc., Lake Charles, La.; S. J. Iverson, Iverson Supply Co., Fort Worth; Elliott Johnson, Schlumberger Well Surveying Corp., Houston; L. A. Little, Lufkin Foundry & Machine Co., Lufkin, Tex.; George O'Leary, Houston Oil Field Materials Co., Houston; Ray O. Shaffer, Welex Jet Services, Fort Worth; H. C. Otis, Otis Pressure Control, Dallas, and W. K. Depass, Standard Supply & Hardware Co., New Orleans.

... Directors for Mid-Continent and Rocky Mountain district include: J. L. Evans, National Supply Co., Torrance, Calif.; W. W. Greenway, Axelson Manufacturing Co., Los Angeles; Don Grubbs, Oil Well Supply Division, Los Angeles; H. J. Hagn, Chiksan Co., Brea, Calif.; Ott Hammer, Security Engineering Co., Whittier, Calif.; Harold E. Howard, Howard Supply Co., Los Angeles; Wendell Jones, Bethlehem Supply Co., Los Angeles; John J. Pike, Republic Supply Co., Los Angeles; W. T. Powell, Emsco Manufacturing Co., Los Angeles; Ted Sutter, Baker Oil Tools, Inc., Los Angeles; and W. A. Wilson, Web Wilson Oil Tools, Inc., Los Angeles.

We've changed things a bit . . .

IF you've missed the "Pipeline" and "Natural Gas" pages that once appeared in the back of the Journal, it's because we've changed things around a bit—for your benefit.

Because of the scope of pipelining and natural-gas industry, we were a bit cramped trying to confine developments in these two fields to the two pages allotted to them. So, we broke the "two page" limit that time and tradition had handed us for pipeline and natural-gas news and now we're giving both industries more space.

In this and all future issues, you will find pipeline and gas news—more than twice as much—in what we believe is a better and more informative news section. For example, in this issue are stories about Minnesota Pipe Line Co.'s new line; A.G.A. estimates for natural-gas industry's expenditures for the next 4 years; the mandate in the Phillips gas case is held up; and the completion of Magnolia's crude line from Corsicana to Beaumont.

We hope you like the new layout—and the additional news.

U. S. Losing Spotlight in . . .

. . . World Tanker Picture

PHILADELPHIA. — The United States is continuing to lose the grip held since World War II as the world leader in ownership of tankers.

Stepped-up foreign construction has reduced the U. S. leadership more than 50 per cent since the immediate postwar years. The U. S. now owns only 26 per cent of the carrying capacity of the world's ocean-going fleet compared to 60 per cent owned immediately after the war.

Ownership of the United Kingdom has jumped to 18 per cent of the world's fleet, Norway to 14.6 per cent and Panama to 9.8 per cent. Immediately after the war, no other nation owned more than 15 per cent of the world's tankers.

These figures were revealed in the twelfth annual analysis of world tanker fleets made by the statistical research division of Sun Oil Co.

The analysis showed a world tanker fleet of 2,502 vessels of 2,000 or more gross tons as of December 31, 1953. These ships totaled 23,473,900 gross tons and 35,732,300 deadweight tons.

Construction review . . . The U. S. is lagging far behind in tanker construction. At the end of 1953, there were on order or under construction only 16 tankers totaling 385,000 deadweight tons which would fly the American flag.

The U. S. total is only 3.2 per cent carrying capacity of the 612 tankers on order or under construction. The world total comprises 13,053,000 deadweight tons.

In Norway, 164 ships of 3,200,000 deadweight tons are on order or under construction. These ships comprise 23.5 per cent of the world total. The United Kingdom has a construction or proposed construction program that totals 23 per cent of the world total.

Where U. S. leads . . . The U. S. maintains its leadership on the basis of speed, and ranks above the world average on the basis of ship size.

The U. S. fleet has an average speed of 14.8 knots, which is the fastest of the four major tanker-owning countries. Second is Panama at 13.8 knots. Norway and the United Kingdom are both slower than the world average of 13.6 knots.

The U. S. and Panama fleets rank evenly as largest in average size at 15,700 deadweight tons. The world average is 14,300 deadweight tons.

The Sun study also showed the U. S. trend is toward supertankers. Average speed for new ships on order or under construction December 31, 1953, was 16.5 knots and deadweight tonnage was more than 24,000.

The study also showed the U. S. fleet is approaching obsolescence faster than the world fleet. Eighty-nine per cent of the U. S. ships were built prior to 1945 compared with 56.7 per cent for the world fleet *(See National Affairs)*.

Gas Industry Will Spend $3.5 Billion by 1958

NEW YORK.—The natural-gas industry will spend $3.5 billion for new construction in the next 4 years, according to American Gas Association estimates.

This estimated 1954-57 expenditure compares with $4.6 billion actually spent on the industry's expansion program during the 1950-53 period.

Expenditures for new natural-gas facilities amounted to $1.25 billion in 1953, the second highest total in gas-industry history. It was the fourth consecutive year that spending for new construction topped a billion dollars.

Expansion of present natural-gas facilities during 1954 will cost an estimated $1.1 billion with an expenditure of $1.05 billion expected for 1955. The industry estimates for 1956 and 1957 are placed at about $750 million each year.

The A.G.A. warned last week that these estimates may prove to be conservative and pointed out that many companies tend to underestimate construction projects planned for the remote future. The association said in spite of the fact that the supply-demand gap has been lessened in the postwar years, there are many factors indicating further growth for natural gas. More pipeline projects will be needed to supply industrial and population growth. Though construction expenditures may decline, the reduction from present levels may be more moderate and gradual than indicated in the estimates.

The $3.5 billion natural-gas estimate amounts to 90 per cent of the total estimated expenditure for the next 4 years for the over-all gas industry. About $1.71 billion will be spent on natural-gas transmission lines. Utilities distributing natural gas will spend $1.33 billion for expanded distribution facilities.

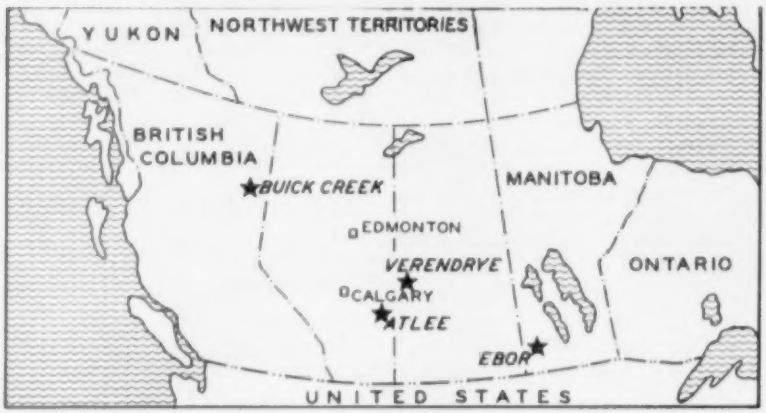
A large proportion of the companies reporting anticipated construction to the A.G.A. also indicated expected methods of financing. These companies expect to obtain 35 per cent of the needed money from internal sources, 47 per cent from debt issues, and 18 per cent from equity issues.

Compared with a similar survey last year, the figures indicate an increase in the supply of internally-generated money and an equal decline in reliance on debt and equity sources.

Here's What Natural-Gas Industry Will Spend . . .

1953-57 Construction Expenditures
(In millions)

	Actual	Forecast				Total forecast	Actual total
	1953	1954	1955	1956	1957	1954-1957	1950-1953
Natural gas—total	$1,252	$1,088	$1,055	$709	$699	$3,551	$4,687
Production and other storage	172	74	67	54	56	251	509
Transmission	673	613	568	260	267	1,708	2,746
Underground storage	44	50	24	27	13	114	155
Distribution	315	312	357	331	331	1,331	1,109
General	48	39	39	37	32	147	168



Four Wildcats Hit

British Columbia has first commercial production as all four western Canadian provinces report successful wells

CALGARY. — Western Canada has four wildcat discoveries, one in each of its oil-producing provinces.

Two wildcats are testing oil at Buick Creek, British Columbia and the Ebor area, Manitoba; two indicated gas discoveries are reported in Alberta and Saskatchewan.

British Columbia's first major oil field may develop in the Buick Creek area where Pacific-West Buick Creek No. 3 recovered 2,780 ft. of free oil on a 1-hour drill stem test. The well tested oil in the interval 3,884 to 3,912 ft. in the Nikanassin formation after penetrating a 39-ft. gas cap in this zone. Operators deepened to the Triassic and tested salt water at this level. Total depth is 4,122 ft. with 7-in. casing set at 3,892 ft.

Buick Creek No. 3 lies on a 60,000-acre British Columbia Government permit that Pacific and associates acquired under farmout from Canada Southern Oils, Ltd. It is 23 miles north of the Fort St. John gas field in a region where Nikanassin gas production was reported at several wells.

Canada Southern kept a 25 per cent net carried interest in the project while the remaining 75 per cent is shared as follows: Pacific Petroleums, Ltd., 37½ per cent; Peace River Natural Gas Co., Ltd., and Sunray Oil Co., 25 per cent; Canadian Atlantic Oil Co., Ltd., 12½ per cent.

Although further tests will be required to evaluate the Buick Creek discovery, this is the first commercial production for British Columbia.

Manitoba discovery . . . Madison Oils, Ltd., et al. are currently testing their Ebor area wildcat after recovering light gravity free oil on a drill-stem test at about 2,715 ft. The well lies 60 miles west-southwest of Brandon and 16 miles southwest of Virden townsite. Madison Oils, A. P. Consolidated, Sunset Oils, Ltd., and Share Oils, Ltd., are drilling the Ebor wildcat on a farmout from the California Standard Co.

Virden is the center of an active wildcat program because of the shallow Madison production. Indications are that this play will extend into North Dakota.

Southeast Alberta . . . In the Atlee area, operators report an indicated gas discovery from the Bow Island sand. There is 15 ft. of sand above water at 2,663 ft. that tested 4,210,000 cu. ft. of gas per day. The well is 50 miles north of Medicine Hat and 2½ miles south-southwest of a recent Sunburst gas sand discovery.

The Atlee well was drilled on a farmout from Home Oil Co., with Home retaining 40 per cent interest in the 20,000-acre reservation spread and operations. The remaining 60 per cent is held by High Crest Oils, Ltd., Canadian Oil & Gas Reserves, Greta Petroleums, Raymond J. Smith & Sons, and Mill City Petroleums, Ltd.

Verendrye gas production . . . Phillips Petroleum Co., and Husky Oil & Refining, Ltd., have a small Viking gas sand discovery in the Verendrye area of western Saskatchewan, 6 miles southwest of Kindersly.

Operators are running casing after testing 1,050,000 cu. ft. per day from 2,284-2,304 ft. in the Viking. In the same area, Husky-Phillips-St. Florence No. 2 well swabbed oil at the rate of 5 bbl. per hour after fracturing the Viking sand below 2,232 ft. This well recovered light gravity oil in June. It is 13 miles northwest of Kindersly and 3½ miles southwest of the Smiley oil field.

Townsite Drilling Slated

VIRDEN, Man.—Ponder Oil, Ltd., will start a 12-well program soon in a section that includes the Virden townsite, but has several obstacles to hurdle before the program is fully developed.

The biggest headache facing Ponder is acquiring mineral rights—a portion of which is held by 800 freeholders.

Of the 640 acres in the townsite, Virden holds mineral rights on approximately 123 acres. The province of Manitoba holds rights on 154 acres while the Canadian National and Canadian Pacific railways hold between 40 and 60 acres. The school board also holds some of the rights and about 200 acres is controlled by the freeholders.

Drilling may start by July 15 on one subdivision controlled by only 12 freeholders. All have signed agreements with Ponder.

Another problem is a provincial regulation that prohibits drilling a well within 33 ft. of a dwelling. Unless this regulation is waved, Ponder may have to purchase and demolish some buildings.

Two Wildcat Sites Staked

WINNIPEG. — Dome Exploration (Western) Ltd., has staked locations for the first two ventures in a 12-well wildcat exploratory program on an undisclosed amount of acreage farmed out in southwestern Manitoba from Canadian Superior Oils of California, Ltd.

Gold Star Drilling Co. has been awarded the contract to drill on the first of the two sites. Dome-Canadian Superior 7-15 North Tilston. The site is 3½ miles north and east of the J. P. Owen 12-32 Tilston Mississippian well.

The other site is Dome-Canadian 5-31 Broomhill, which is located 10½ miles east of the Owen 12-32 Tilston producer. Commonwealth Drilling Co. has the drilling contract.

Sulfur Bids Asked

Continental Shelf leasing outlined by Government

WASHINGTON. — Nominations of areas of the federally-held outer Continental Shelf to be put up for sulfur leases have ben invited by Interior Secretary Douglas McKay.

Closing dates for nominations have been made the same as for oil and gas areas, August 3 for locations off Louisiana and September 3 for areas off Texas. It is planned also to open bids for sulfur leases at the same time as those for oil and gas, now tentatively set at October 13 for Louisiana and November 9 for Texas.

Under the Continental Shelf Act, the holder of a lease for oil and gas development is not permitted to produce sulfur if he finds it on his lease area. In such a situation he could, however, seek a sulfur lease but could secure it only by competitive bidding.

If any areas are nominated both for oil and gas and for sulfur the department is expected to designate it for one or the other but not for both. There is no prohibition, however, against a bidder seeking separate leases for oil and sulfur on the same area. But, it is questionable whether the area would be identical in size for both products.

Administration of the outer Continental Shelf is raising many problems never encountered in decades of handling the oil and gas and other resources of the public domain, and an interdepartmental committee, consisting of officials of the Bureau of Land Management and Geological Survey and engineers, geologists and lawyers, has been set up to deal with them as they arise.

Phillips Mandate Held Up

WASHINGTON.—The Supreme Court's mandate in the Phillips case was held up last week by the filing of a petition for a stay by Dan Moody, Texas attorney.

Moody filed his petition on behalf of his state, Oklahoma and New Mexico to have the mandate held up until the court can pass on the application of the Phillips Petroleum Co. for a rehearing of the case in which its sales of natural gas to interstate pipelines were held subject to regulation by the Federal Power Commission.

The earliest date on which the court normally would announce whether it would entertain the company's application is October 11.

Following the filing of Moody's petition, the opposing parties were advised of his action and given time in which to file their objections to postponement of the mandate. The matter then was referred by the clerk's office to one of the justices, and it is expected his decision whether to grant the stay will be made this week.

OGD Gets Revamping

WASHINGTON.—Interior Department officials have modified the Oil and Gas Division to meet the cut of $50,000 made by Congress in the agency's request for funds.

With a $250,000 appropriation the number of technical men to be employed has been reduced from 10 to 7. Three are yet to be appointed.

Since most of the matters coming before the OGD are closely related to operations in the industry rather than policies, it is considered necessary that most of the staff be men with long industry experience and technical training. What appeared to be an overbalanced organization met with little sympathy from the House appropriations committee, which cut the OGD's request for $300,000 to $100,000. But the Senate committee was more liberal and the final agreement on the bill cut the fund only $50,000.

Chamber Names Industry Men

WASHINGTON.—Nine representatives of the oil and gas industry have been named to the 44-member natural resources committee of the U. S. Chamber of Commerce.

The committee develops the policies supported by the chamber for the development of extractive natural resources, energy supply, conservation and land utilization.

Named to the committee were Rex G. Baker, vice president, Humble Oil & Refining Co., Houston, Tex.; Robert R. Blackburn, vice president, Southern California Gas Co., Los Angeles; F. S. Bryant, vice president, Standard Oil Co. (Calif.), San Francisco; H. B. Fell, president, Simpson-Fell Oil Co., Ardmore, Okla.; J. W. Hargrove, secretary-treasurer, Texas Eastern Transmission Corp., Shreveport, La.; Walter M. Jeffords, Jr., president, Brooklyn Borough Gas Co., Brooklyn, N. Y.; J. E. Swearingen, vice president, Standard Oil Co. (Ind.), Chicago; Franklyn Waltman, director of public relations, Sun Oil Co., Philadelphia, and C. I. Weaver, director, Ohio Fuel Gas Co., Springfield, Ohio.

Export Boost Asked

Panhandle Eastern seeking to increase gas to Canada

WASHINGTON.—Authority to nearly quadruple the volume of natural gas it is now exporting to Canada has been asked of the Federal Power Commission by Panhandle Eastern Pipe Line Co.

Panhandle, which now exports 5.5 billion cu. ft. of gas annually to the Union Gas Co. of Canada, asked to increase the volume to 16 billion cu. ft. over the period of a year, with a further gradual increase to 20 billion cu. ft.

The increased exports, the company explained, would be primarily for the purpose of developing a market for the projected Trans-Canada pipeline in the Hamilton, Ont., area, under a new contract which could run for a maximum of 20 years but may be terminated as soon as the Trans-Canada line goes into operation.

By the time the Canadian line goes into service, F. H. Robinson, Panhandle vice president said, it is expected requirements of company customers in the United States will have increased to an extent which will absorb all of the additional gas sold Union Gas Co. of Canada. Only off-peak gas is involved in the export transaction and contract commitments of Panhandle to domestic customers will be met in full before any additional gas is exported, he said.

Both the Canadian and Ontario governments have indicated their approval of the plan as helping to build a market that later could be supplied with gas from Alberta.

Coker Gets Tax Writeoff

WASHINGTON. — Accelerated amortization of a $3,000,000 project of Standard Oil Co. of Indiana for 8,000-bbl. daily fluid coking unit at its Wood River, Ill., refinery has been approved by the Office of Defense Mobilization.

The company will be allowed 5-year write off of 30 per cent of $2,439,000 for basic facilities, 45 per cent of $546,000 for auxiliary equipment and 15 per cent of $15,000 for buildings.

Trade-ins Approved

House, Senate pass bills for tanker building boost

WASHINGTON. — Legislation authorizing "trade-in" allowances for T-2 tankers to be applied by private shipping interests toward the construction of new fast tankers was passed by the House last week.

A similar measure was passed previously by the Senate and the differences in the two versions will be ironed out by a conference committee.

The bill is aimed at the development of a fleet of modern, high-speed tankers to replace World War II vessels which would be placed in the reserve fleet.

The plan to have the Government buy the wartime T-2 tankers is based on warnings of defense officials that there is a critical deficiency and shortage of vessels in the reserve fleet.

Another objective is to meet the problem of replacement raised by the fact that 83 per cent of our present tankers will be obsolete in another 7 years. Unless action is taken now it will be necessary to replace all of them after that time. *(See Industry Affairs.)*

New Twist in Onassis Deal

WASHINGTON.—A note of uncertainty over the Onassis deal for the tanker transport of Saudi Arabian oil was raised here last week with reports the Saudi Arabian Government has assured the United States it will not bar American-flag tankers.

A State Department spokesman said the assurance was given in talks with George Wadsworth, American ambassador, who protested the 30-year agreement, also protested by the Arabian American Oil Co. as violating its 1938 concession.

The State Department is concerned over not only the Onassis arrangement itself but the possibilities it has raised for international shipping controversies.

Committee Approves Stueck

WASHINGTON. — Nomination of Frederick K. Stueck of St. Louis as a member of the Federal Power Commission was approved by the Senate interstate commerce committee last week after a brief hearing and without opposition.

Stueck, upon confirmation by the Senate, will succeed Dale E. Doty, whose term expired last month. He will serve a 5-year term.

WATCHING WASHINGTON

Bertram F. Linz

Imports Meetings Killed

An industry-wide meeting to discuss the import situation and develop recommendations to meet it has been ruled out by the Department of Justice.

Regardless of whether such a meeting was sponsored by the industry or the government it would be viewed with suspicion by the department, the Independent Refiners Association of America was told by Assistant Attorney General Stanley N. Barnes, head of the antitrust division.

The views of the department were solicited by M. H. Robineau, president of the IRAA. He said that Barnes' response offered little hope of reaching a solution to the import problem through industry conferences. While Barnes specifically pointed out he was not giving an advisory legal opinion, his reply, Robineau said, makes it clear the only way to deal effectively with excessive imports is by some type of legislative arrangement.

Barnes made the department's position clear in two sentences.

"Although meetings of competitors may not necessarily violate the antitrust laws, they do afford an excellent climate from which such violations frequently result," he said.

"We suggest that it may be difficult for companies, in contemplation of the antitrust laws, to take 'independent' action which follows prior group recommendations."

Tax Aids Suggested

Tax amortization benefits for companies which move their plants out of bomb-target areas have been suggested by Defense Mobilization Director Arthur S. Flemming as a means of accelerating industry toward more realistic civil defense programs.

Flemming's suggestion has been given added weight by a warning in the latest Bulletin of the Atomic Scientists that a Russian air raid any time within the next 3 years could destroy or isolate the oil products needed to operate trucks and automobiles, diesel locomotives, and oil-burning electric plants. This could be accomplished by bombing the wholesale centers, the pipeline terminals, and the shipping ports.

Flemming, one of a number of administration officials urging that civil defense planning be stepped up, pointed out that writing off part of the investment over a 5-year period has been granted for new plants which comply with dispersal standards, but has not been offered companies which want to transfer from target areas to locations less likely to suffer enemy air attack in the event of war.

Best defense against nuclear attack is dispersion, according to Gen. W. S. Paul, assistant director of nonmilitary defense in the ODM. This doesn't mean moving plants into the desert, Paul explained, but putting them at least 10 miles from the boundary of a target zone to obtain relative safety and still meet economic requirements.

Senator Reveals Findings

Sen. George W. Malone of Nevada, who has just wound up a 10-month investigation of the raw materials situation, thinks industry is entirely too timid in its approach to Congress.

One of the things Malone has concluded is there are vast reserves of oil and minerals still to be tapped in this country.

To find and develop those resources, however, the extractive industries need proper incentives and protection against low-cost foreign oil and minerals. The oil and mining interests are not effective in seeking, the incentives and protection, Malone said.

Discussing the matter privately, Malone has disclosed that the Treasury is still opposed to the oil industry's 27½ per cent depletion rate and, in fact, made an attempt to knock it down when the tax-revision bill was before the Senate finance committee.

No relief from excessive imports, he says, will be forthcoming so long as the Tariff Commission is used merely as a fact-finding body with no authority to act and without influence to have its recommendations adopted.

What is needed, Malone says, is even higher depletion rates, if necessary, to encourage full-scale exploitation of our domestic raw materials, and a return of tariff-making powers to Congress.

NEW MEMBER James Milliken, Fluor Corp., receives his hard hat and Turtle Club certificate from Harvey Vann, Fluor construction superintendent. A 4-ft. steel rod which fell from overhead piping struck Milliken's hat so hard it forced the brim into the bridge of his nose.

"Shell on head . . .

We're Not Dead"

. . . Turtle Club motto

D. H. Stormont

LOS ANGELES.—Members of a select group in the petroleum industry probably value their exclusive club more than anything else on this earth.

They were elected to membership in this group—the Turtle Club—because at one time they would have received fatal injuries had they not been wearing safety or "hard" hats. Thus their slogan, "Shell on head—we're not dead."

Man's interest in protecting his head from hard blows, accidental or otherwise, dates back at least 3,500 years but the industrial safety hat is comparatively new. It is a descendant of the war helmet used in sword-swinging days. These all but disappeared with the invention of firearms, but again came into use during World War I. Sired in some respects by the 200-year-old fireman's hat, the safety hat as used in industry today is only about 30 years old.

It is impossible to estimate how many fatalities have been avoided because workers hit by falling or flying objects were wise enough to be wearing hard hats. One oil company, which I year counted only 36 employes wearing safety hats, also counted seven severe head injuries. Five years later, when 2,493 employes were wearing these hats, there was only one serious head injury and 10 other serious injuries were avoided by protective headgear.

Club purpose . . . Purpose of the Turtle Club is to lend the prestige and cumulative experience of its members to the promotion of more widespread acceptance and use of hard hats. The club also assists in the safety movement through industry or safety councils or other approved agencies.

Some 225 persons have joined the club since it was organized in the United States in 1950 by E. D. Bullard, San Francisco. A Canadian lumber company safety director fathered the idea in 1930.

Not too many of these members are from the petroleum industry. This could be construed as a reflection of its comparatively good safety record. Actually it is probably because not many people know about the organization's existence.

Passing the necessary "entrance examination" makes a man eligible for membership. When accepted for membership he receives a certificate, a new hard hat with the Turtle Club insignia, and an identifying lapel pin.

Typical of the certificates issued is that of new-member O. G. Adams, member of a Continental Oil Co. well servicing crew at Forsan, Tex. In part it read:

"On April 6, 1954, while laying down tubing, the wind blew the elevator into the pumping jack beam, causing the elevator bail to drop through and unlatch the elevator. This caused a joint of 2½-in. tubing to fall, striking Mr. Adam's safety hat. He received lacerations of forehead and scalp, but X-rays were negative for fracture, which could have proven fatal to him."

A typical comment of newly-qualified members is: "If I had not been wearing my hard hat I wouldn't be here to tell you how it happened."

Needless to say, Turtle Club members are enthusiastic boosters for hard hats.

New Sonic Drill Tested

VENTURA.—The sonic drill being developed by Borg-Warner Corp.'s Petro-Mechanics Research Division early in July underwent an experimental test at a Honolulu Oil Corp. wildcat north of the Rincon field.

Results of the test in the "no dope" wildcat were not released, but it is believed that sound-powered percussion drill gave a creditable performance. The run was made at a depth below 5,000 ft. and in hard formations which in the previous 3 days had been cut with rotary bits at the rate of 50 ft. daily.

For the past 18 months the drill has been undergoing development and test drilling with poured concrete "formations" at a shallow Ventura Avenue well *(The Oil and Gas Journal, June 7, page 62)*. Use at Honolulu 1 Sunray-Dunshee, in the Coyote Creek area, is believed to be the first field test of the improved drill.

Antismog System Planned

LOS ANGELES.—Standard Oil Co. of California will install a gasoline vapors recovery system at its Clearwater tank-truck loading terminal as a voluntary measure to help control smog.

If the $40,000 installation proves satisfactory, Standard will equip other

large truck-loading terminals in the Los Angeles region with similar systems.

Standard officials claim the escaping vapors do not contribute to smog, but said the program is part of the company's "reasonable effort" to help solve the area's smog problem. The Air Pollution Control District regards vapors escaping from terminals and service stations as a major contributor to smog, but has passed no regulation requiring the recovery systems.

Stocks Continue Rise

Supply in five West Coast states tops demand during June despite slash in crude imports and California production

LOS ANGELES.—Total petroleum stocks in the five West Coast states continue to increase despite reduced crude imports and a cutback of 10,000 bbl. daily in California's heavy crude production.

A year ago light and middle-barrel products were the reasons for gaining inventories, but residual fuel is the principal factor in the current situation.

Lessened offshore military demand coupled with loss of a portion of the market formerly supplied in the Pacific Northwest are the principal reasons total demand figures are trailing those of a year ago. Increased shipments of products into area from the Rocky Mountain district also are contributing to the situation—one in which total demand is being outstripped by total supply.

Only slight increase . . . According to estimates made by the Oil Producers Agency, total stocks showed only a slight gain in June. Gasoline stocks were declining at the rate of about 50,000 bbl. daily. However, the seasonal increases in residual stocks of some 85,000 bbl. daily more than offset these withdrawals.

Last month's picture compared with estimated gains in total stocks of 76,000 bbl. daily in May and 4,000 bbl. daily increases in April, according to Bureau of Mines monthly figures and weekly reports of the American Petroleum Institute. Inventories at the close of May were estimated at 127,269,000 bbl., up 19,306,000 bbl. over those of a year ago.

Resid stocks up . . . At the end of April, after increasing 24,000 bbl. daily for the month, residual stocks totaled 21,668,000 bbl. This was 4,681,000 bbl. more than at the end of April 1953. Based on May estimates of 52,000 bbl. daily additions, these stocks were 23,280,000 bbl. at the first of June. This was a gain of 7,092,000 bbl. over the level at that time a year ago.

Imports down . . . Foreign crude imports were estimated by the Oil Producers Agency to have averaged about 25,000 bbl. daily during June. Imports during April have been placed at 30,000 bbl., compared with 103,000 bbl. daily in April 1953. May imports were estimated to have averaged about 55,000 bbl. daily.

Royalty Tiff Looms

Long Beach may have court fight over tidelands money

LONG BEACH.—Later this year the city of Long Beach probably will learn how much of a battle it may expect to keep all the income from its tidelands oil properties, as well as the right to spend half of this income for civic improvements outside beach and harbor areas.

The lines have yet to be more fully defined but residents of some "have-not" counties are objecting to the tax advantage supposedly being enjoyed by Long Beach citizens. The situation, they claim, is in violation of California's constitution, which says that no citizen or class of citizens shall enjoy privileges not available to all.

In a suit now pending before the State Supreme Court, a resident of Long Beach challenges the city's right to spend tideland oil revenue for upland improvements. Last year in a city election Long Beach taxpayers authorized some $40,000,000 to be shifted from these funds to finance certain construction programs. A lower court has ruled in favor of the city.

Recently the Supreme Court in San Francisco permitted a "friend of the court" brief to be filed by a group of Tulare County taxpayers. In essence they claim Long Beach is building up a "tax-free Utopia," and that the $152,000,000 in its tideland fund rightfully belongs in the state treasury.

The court set June 30 as the deadline for filing of briefs. Any replies have to be filed before July 15. Because of the brief periods of time involved the court is expected to hand down its decision this fall.

Not complete answer . . . Settling of this case, the Felix Mallon suit, will answer only one question—the city's right to spend 50 per cent of the tidelands funds for other than harbor improvement purposes. It is not expected to shed light on the ownership of the funds.

When the state legislature convenes again in about 6 months is not unlikely representatives from some of the ranching and farming counties will propose legislation that some, or all, of the city's oil income be shifted to the state.

This is because of the conditions under which Long Beach was awarded offshore rights up to the 3-mile limit. When the state took this action in 1911 it was for the express purpose of developing a harbor.

General belief of oil industry legal people is that Long Beach unquestionably owns the submerged oil lands lying offshore from its city limits, and that it is not obligating terms of the trust under which title was granted. However, the huge sums involved—the $152,000,000 already accumulated and probability that this will increase several times in coming years—probably will result in its ownership being challenged.

State park leases . . . Another issue between Long Beach and the state is ownership of the submerged lands off a 2,300-ft. strip of beach on the city's eastern boundary.

Flood Started

Dominguez scene of first big project in California

LOS ANGELES.—First large-scale cooperative water-flooding program ever to be operated in California was started July 1 at the Dominguez field by Union Oil Co., Shell Oil Co., and Dominguez Oil Fields Co.

Injection of water into the First East Central pool was through five wells. During the month the remaining 12 input wells will be placed in operation. At peak capacity approximately 10,000 bbl. of Dominguez-produced brines will be injected through the 17 wells. To prevent migration of oil from one property to another, a wall of water is being built up along the boundary between Union's and Shell's properties.

More than 2 years of pilot tests and engineering studies were conducted before the full-scale program was started. These indicate the flood will materially add to the field's crude-oil reserves *(The Oil and Gas Journal, June 28, page 77)*.

Huge Purchase Closed

Dorchester pays Panoma $118,500,000 for 218 gas wells, two natural-gasoline plants in Panhandle, Hugoton fields

DALLAS.—One of the biggest sales of producing and processing properties in recent years, a whopping $118,500,000 deal, was consummated last week by Dorchester Corp., a wholly owned subsidiary of Oil & Gas Property Management, Inc., Dallas, and the former stockholders of the recently dissolved Panoma Corp.

Dorchester Corp., operating out of Amarillo, Tex., will take over ownership and operation of 218 net gas wells on 133,788 net acres of leases in Panhandle and Hugoton fields of Texas, Oklahoma, and Kansas. Production from these wells has been averaging about 170,000,000 cu. ft. of gas daily, according to John A. Crichton, president of Oil & Gas Property Management.

The biggest portion of the production is in Texas County, Oklahoma, where the new owner has acquired 121 net wells and more than 77,700 net acres of leases. Also included are 83 net wells and about 47,000 net acres of leases in Gray and Carson counties, Texas, and 14 net wells and about 8,800 net acres of leases in Stephens County, Kansas.

All of the purchased leases have been completely drilled, Crichton said. Dorchester, however, is studying a comprehensive well-reworking program for the properties.

Gas plants included . . . In addition to the producing properties, Dorchester also purchased two former Panoma Corp. natural-gasoline plants—one near White Deer, Tex., in eastern Carson County, the other near Hooker, Okla., in Texas County.

The White Deer plant last year processed about 30 billion cubic feet of natural gas and produced about 31,000,000 gal. of liquids. The Hooker plant processed at about the same rate last year, producing about 30,000,000 gal. of liquids. The Hooker plant was built in 1949. The plant at White Deer, an older installation, recently was revamped, Crichton said.

Dorchester paid $6,500,000 for the two gasoline plants directly to the former Panoma Corp. stockholders. These include: D. D. Harrington, Stanley Marsh, Jr., Estell Fariss Marsh, Isabel Marsh McCormick, and T. J. Wagner, Jr., all of Amarillo.

The purchase of the producing properties, which involves payment of $37,000,000 in cash and $75,000,000 in reserved payments from production, actually was consummated with Nalam Corp. The latter company was set up by the Panoma stockholders specifically to sell the properties.

Second big deal . . . This was the second major purchase of production properties negotiated by Oil & Gas Property Management this year.

Earlier in the year, the organization paid about $12,000,000 partly in cash and partly in deferred payments from production to Floyd L. Karsten and associates for 150 wells in 28 fields in the Texas Gulf Coast area, 1 well in Louisiana, and several more in New Mexico.

In addition to the existing producers, there are proved locations on the acreage acquired in the Karsten transaction for a number of new wells. An active drilling program is in the planning stage, Crichton said.

Crude Line Finished

Magnolia testing 20-in. Corsicana-Beaumont link

DALLAS.—Magnolia Pipe Line Co. has completed all welding and currently is water-testing its new 208-mile, 20-in. crude line from Corsicana to Beaumont.

The line late last week had been water tested south from Corsicana to Mile Post 55. Testing was delayed temporarily when two pipeline scrapers stuck in the line where sliding rock had bent the pipe slightly. The damage was repaired quickly and testing operations resumed.

Magnolia expects to complete testing, backfill, and cleanup in time to start oil moving through the new line by August 1. The one major river crossing involved in the project, the Trinity River, has been completed.

The new pipe follows an almost straight line from Corsicana to Beaumont. Its route crosses the Trinity River

Monument Marks First North Texas Gas Well

A 6-ft. granite monument has been erected marking the site of the first gas well in North Texas, Clayco Oil & Pipe Line Co. 1 J. W. Lockridge in Petrolia field. The unveiling, executed by L. T. Potter, executive vice president of Lone Star Gas Co., Dallas (left), and H. P. Nichols, executive vice president of the East Texas Oil Association, Tyler, took place on Highway 148 on a 1-acre tract 13 miles north of Henrietta. Lochridge 1 was completed May 5, 1907, at 1,410 ft. flowing 10,000,000 cu. ft. of gas daily. It is generally attributed as having touched off full-scale development of the gas industry in Texas and led to the formation of Lone Star Gas in 1909. Lone Star completed construction of the first long-distance, large-diameter gas line in the Southwest—a 125-mile, 16-in. trunk from Petrolia field to Dallas—in 1910. Presiding at the dedication ceremony (behind marker) was Edward G. Kadane, Wichita Falls independent operator.

10 miles south of Oakwood, and passes near the towns of Crockett, Livingston, and Sour Lake.

The line will carry crude delivered into Corsicana, the central gathering point on the Magnolia pipeline system, from West Texas, New Mexico, North and East Texas, and Oklahoma. The company's old multiple-line system from Corsicana, which follows an arcing route to Beaumont well to the west of the new line, will be retired from Corsicana to the company's Hull Junction. At this point, almost directly west of Beaumont, branch lines carrying crude from Southwest Texas tie in to the old system. The multiple lines from Hull Junction on to Beaumont will be kept in operation to carry this crude.

Magnolia's new 20-in. will have an initial carrying capacity of 122,000 bbl. of crude daily, by virtue of the installation of three new 1,250-hp. centrifugal pumps at the existing Corsicana pump station. Design plans for the project call for boosting pumping capacity of the line to 165,000 bbl. daily if the need should arise by adding another pump station along the route.

In addition to the pumps at Corsicana, two new 120,000-bbl. tanks plus necessary tank-farm lines are being installed. Six 122,500-bbl. tanks and connecting lines are being built at Magnolia Petroleum Co.'s Beaumont refinery. Meter installations are being provided at Beaumont so that oil delivered at the refinery will be measured automatically.

Favorable weather, among other things, is enabling the company to beat by more than a month the original completion date for the project. Construction contractor is H. B. Zachry Co., San Antonio. About 112 miles of the pipe was coated at Houston by C.R.C. Engineering Co. and Mayes Brothers, Inc. The rest was coated over the ditch.

Crude Line Contracted

HOUSTON. — Houston Contracting Co. has been awarded the construction contract on a 72-mile, 8-in. crude line which Shell Pipe Line Corp. plans from Halletsville to Brookshire, Tex.

The new line, which will have a 13,500-bbl. per day capacity, will connect with the company's 10-in. line at Brookshire permitting movement of crude from Gholke field near Victoria, Tex., to Shell's Houston refinery.

48,000-Acre Block Leased

DALLAS.—R. H. Venable, Dallas, and Sid Katz, San Antonio, have leased a 48,000-acre block comprising the McFaddin estate ranch in western Knox County and eastern King County.

Big Unit Approved

Pressure-maintenance program slated for portion of Parks field; 7,500,000 to 22,500,000-bbl. added recovery seen

Robert J. Enright

DALLAS.—A unitization and pressure-maintenance program which is estimated to recover an additional 7,500,000 to 22,500,000 bbl. of oil from the Bend section of the Pennsylvanian in Parks field in Midland County was approved by the Texas Railroad Commission last week.

This is the second major unitization and pressure-maintenance project given the go-ahead in Midland County in a little more than 2 months. Late in May, the commission approved an even bigger project for the Pennsylvanian and Ellenburger formations in Pegasus field *(The Oil and Gas Journal, May 31, page 54)*.

The new Parks unit, in eastern Midland County directly north of Pegasus, takes in more than 8,400 acres on the east side of a north-south fault running through the 10,800-acre field. Magnolia Petroleum Co., designated unit operator, is by far the largest operator in the field with a percentage participation in the unit of nearly 92.5 per cent.

Pressure - maintenance operations in the Bend section, topped at 10,400 ft., initially will consist of a $167,800 five-spot pilot flood on the eastern edge of the field. Water for the operation will be obtained from the 4,700 to 5,200-ft. San Andres formation. A Magnolia spokesman said last week injection can be started within 4 months.

Unit agreement testimony presented by Magnolia before the Railroad Commission disclosed that 100 per cent of the operating interests and about 90 per cent of royalty interests in the unit area have signed the agreement.

Participation is based on gross acre-feet of formation—the amount assignable to various interests being subject to redetermination from time to time, with adjustments to be made retroactive on underpayments only.

Agreement conditions . . . Operators are obligated to develop the Bend section in the field to a density of one well to each quarter section with a 10 per cent tolerance within 3 years after the effective date of the unit agreement. They are also obligated to drill additional wells deemed necessary by the operators committee to drain the reservoir adequately when full pressure-maintenance has proved feasible.

Operators are committed to begin construction within 60 days of unit approval of facilities necessary to carry on the pilot-flood operation.

Participants in the project, in addition to Magnolia, are: Austral Oil Exploration C., Inc., et al.; J. C. Barnes; Brooks Oil Corp.; Ralph Lowe; Spartan Drilling Co.; The Texas Co.; and G. H. Vaughn Production Co.

The reservoir . . . Parks Pennsylvanian was discovered in December 1950. The field is a faulted anticline with water-oil contact east of the north-south fault at —7,791 ft. and west of the fault at —8,000 ft.

Original bottom-hole pressure of 4,567 psi. had declined to 2,420 psi. in January 1954. Initial solution gas-oil ratio was 1,817 : 1. The average gas-oil ratio during January, February, March of this year was 6,255 : 1. Drive is solution gas, and there is no gas cap. Testimony presented during the hearing showed that continued operation under primary means alone would result in ultimate recovery of only 17 per cent of original oil in place or about 15,000,000 bbl.

In the field area, 4,160 acres have been developed with 52 wells. There are about 20 proved but undrilled locations. Daily average oil production from the Bend section during May was about 1,692 bbl. The current top allowable in the field is 210 bbl. daily.

Magnolia estimates that field-wide pressure maintenance will increase ultimate primary recovery (15,000,000 bbl.) by 50 to 150 per cent.

Pegasus progress . . . While the Parks unit was being approved, Magnolia was proceeding with preparations to launch pressure-maintenance operations in Pegasus field to the south. Contract for building a water-injection plant has been let to Olson Construction Co., Houston, and work is under way. Water will be injected in pilot operations into both Pennsylvanian at 10,300 ft. and the Ellenburger at 13,000 ft.

A pilot high - pressure gas - injection project also will be carried out in the Pennsylvanian in a different portion of the field. A 3-in. high-pressure gas line for injection is being laid in the field, and it is thought that gas injection will start within 30 to 45 days.

Water injection into the Pennsylvanian will be started in about 3 months and into the Ellenburger a little later.

Gas Line Appeals Set

North Dakota Natural's tentative OK to build Tioga-Fargo pipeline to be reviewed; Northern Natural hearing slated

BISMARCK.—A motion to dismiss two appeals from Public Service Commission orders on North Dakota Natural Gas Transmission Co.'s proposed natural-gas pipeline from Tioga to Fargo will be heard here July 14 in Burleigh County District Court.

One appeal was filed by three coal companies, Truax-Traer, Dakota Collieries, and Baukol-Noonan, asking the District Court to direct the commission to review and reconsider its May 24 order giving North Dakota Natural a conditional certificate.

The second appeal is by five North Dakota communities near the proposed route, Larimore, Michigan, Lakota, Niagara, and Petersburg. They are asking permission to intervene to obtain gas service. The commission rejected their application on grounds that the communities had not appeared in the case previously.

R. W. Wheeler, commission counsel, will argue for dismissal on grounds the commission's May 24 order was not final and cannot be appealed.

Opposition's hearing set . . . Also seeking to build the line is Northern Natural Gas Co. of Omaha. A hearing on Northern Natural's application is scheduled August 2.

New hearing protested . . . North Dakota Natural's application for reopening the hearing to modify six of the commission's conditions has been held up by court action.

The three coal companies and three railroads, the Northern Pacific, Great Northern, and Soo Line, filed answers with the commission objecting to a new hearing on grounds that there has been no change in law or fact, that the petition for reopening the hearing is invalid because it did not state what further showings are to be made, and that it is essentially a petition for rehearing, which should have been filed 15 days after the commission's order.

Carter, Sinclair Top Sale

NEW TOWN, N. D.—Carter Oil Co. and Sinclair Oil & Gas Co. acquired the bulk of 15,490 acres on the Fort Berthold Indian Reservation at an oil and gas lease sale. The two companies jointly leased 10,989 acres in 42 tracts for a bonus of $141,319.

The sale totaled $229,144. Highest bonus per tract was $50 paid by Stanolind Oil & Gas Co. Bonuses averaged $14.78.

Another sale will be held here July 27 with 15,668 acres offered in Townships 149 and 150n-90w of McLean County.

Spacing To Be Set

Action slated July 20 on three North Dakota pools

BISMARCK. — The State Industrial Commission will consider spacing for three North Dakota oil pools at a hearing here July 20.

Temporary (18-month) spacing was set for McGregor field in Williams County, opened by William Herbert Hunt's 1 Gohrich, a Madison lime discovery 4 miles northwest of Tioga field.

Proper spacing will be set for Tioga Madison pool, second largest field in the state with 80 producing wells, and for East Tioga Madison pool opened by Amerada Petroleum Corp.'s 1 Clifford Rice 3 miles east of Tioga field in Mountrail County.

Operators are expected to ask for 80-acre spacing, the pattern followed with one exception in Tioga field.

Considerable interest is attached to the Tioga field hearing because all but one of the hearings to date in North Dakota have been for temporary spacing. The exception was a 1952 application for 80-acre spacing in Beaver Lodge Madison pool, the state's largest. It was rejected for a 40-acre pattern.

Drilling Program Slated

DENVER.—An important exploratory drilling program is slated for the southern portion of the Denver-Julesburg basin with the Permian Lyons sand as the objective.

The program will be started by Eddie Fisher, Brush, Colo., and Joseph M. Gross, Los Angeles. The activity will be the first for the area in several years. The first of a series of four Lyons sand tests in El Paso and Pueblo counties will be the 1 Rasner, SW SW NW 25-17s-60w, El Paso County, in the Colorado Springs area. New Drilling Co. is contractor for the series expected to begin this week.

A 50,000-acre lease spread through the area has been taken by the operators from Eugene B. Wolpert, Visalia Syndicate, Los Angeles.

Rank Wildcat Successful

ATWOOD, Kans.—Pennsylvanian oil has been recovered at a rank wildcat on the extreme eastern edge of the Denver - Julesburg basin in Rawlins County, Kansas.

Ashland Oil & Refining Co. 1 Kacirek, 40 miles east of the Colorado line on a seismic prospect, recovered 800 ft. of heavily oil-cut mud and heavy oil, 40 ft. of oil-cut salt water on a 2-hour drill-stem test at 4,200-37 ft. in the Topeka. Recovery on another test was 1,140 ft. of gas, 240 ft. of free oil and 12 ft. of oil-cut salt water.

The wildcat is on a 12,000-acre block. It is a test to the Arbuckle at about 5,100 ft. The significant prospect is about 15 miles southeast of a noncommercial Pennsylvanian discovery made by Ben Brack 3 years ago near St. Francis in Cheyenne County.

Adena Output Restricted

DENVER. — Production in South Adena field, Morgan County, Colorado has been ordered restricted to no more than 125 bbl. per day per well by the Colorado Oil and Gas Conservation Commission.

The order will remain in effect for 6 months at which time another hearing will be necessary to continue the restriction. A limit of gas production not to exceed 150,000 cu. ft. per day, with the first limit reached by any given well to govern was also imposed.

Correction

In last week's issue of The Oil and Gas Journal (July 5, 1954), on page 126, the wrong by-line was applied to the article dealing with reservoir data and entitled "Fifteen Practical Field Calculations." This article was written by Dr. Ralph F. Nielsen, professor, department of petroleum and natural-gas engineering, Pennsylvania State University, State College, Pa.

Butadiene Firm Formed

New York investor announces new corporation organized to build plant on Gulf Coast; proposed site not revealed

NEW YORK.—Plans for a privately financed butadiene plant in Texas apparently have jelled, with the new facility scheduled to be constructed somewhere on the Gulf Coast.

Carl M. Loeb Rhoades & Co., New York investment firm, announced late last week that a new organization, Texas Butadiene & Chemical Corp., has been formed to build a butadiene and alkylation plant on the Gulf Coast. It was reported the proposed plant will convert butane to butylenes and butadiene.

Several reports have been circulated in recent weeks about the privately financed butadiene plant, but little has been released previously other than that the plant was being considered by several firms *(The Oil and Gas Journal, May 10, page 58)*.

Firms participating in the venture are Loeb Rhoades, William R. Staats & Co., Los Angeles, Wertheim & Co., New York, Warren Petroleum Corp., Tulsa, and Fluor Corp., West Coast engineering and construction firm.

Dr. Robert L. Purvin, of Purvin & Gertz, Dallas consulting engineers, was listed as president of Texas Butadiene & Chemical.

No final decision . . . A spokesman for one of the organizations pointed out the final decision of building the plant has not been made. He said studies currently are under way to determine potential markets and pick a plant site that will fit the needs of the organization.

Interest in the privately financed plant has been stimulated by the Government's disposal of synthetic rubber facilities, which includes eight butadiene plants. The Rubber Producing Facilities Disposal Commission received bids in May on the 27 Government-owned facilities, but will not determine high bidders for the works until December.

It has been reported the plant proposed by the private firms will use Houdry Process Corp.'s dehydrogenation process to produce butadiene directly from normal butane or from butane-butene mixtures and will be able to undersell the present markets by employing the improved process.

Expansion Complete

Conoco boosts capacity of Lake Charles refinery

LAKE CHARLES.—Continental Oil Co. has completed an expansion and modernization of its refinery here, boosting the plant's capacity to 45,000 bbl. per stream day or 4½ times the plant's original throughput.

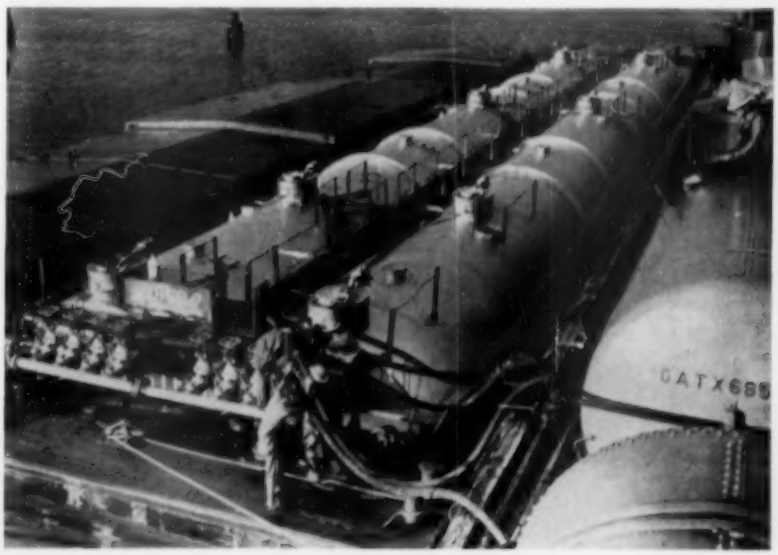
Among the units added to the refinery is a new atmospheric crude topping unit. The new unit is designed to process 30,000 bbl. per day, but has been operated at a capacity of 38,000 bbl. per day. Conoco also modified an original topping unit, increasing its capacity from 12,000 to 16,000 bbl. per day.

A portion of the topped crude is transferred by pipeline to the Cit-Con Corp.'s lubricating-oil plant 7 miles from the refinery. The balance is sent directly to one of the catalytic cracking unit feed preparation sections. At the lube-oil plant, the topped crude is vacuum distilled, producing raw lube cuts which are processed by the latest techniques to produce lubricating oils and waxes.

Two streams are returned from the Cit-Con plant to the refinery. One stream is a blend of gas oil, slop waxes, and extracts from the solvent extraction of distillate lube fractions. This stream is catalytically cracked at the refinery. The other stream, a residual extract from bright stock operation, is returned separately for visbreaking.

Two new crackers . . . Two new Thermofor catalytic cracking units also have been constructed at the refinery. The two cat crackers have separate feed preparation facilities. One feed preparation system is designed to feed only distillate stocks and consists of a charge drum, a vaporizer furnace, and a flash drum. The feed preparation system of the second cat cracker differs from that of the other in that a vacuum flash tower is employed.

Also new at the refinery is a catalytic reforming unit. The unit processes two types of stock on a blocked-out operation. It is a four-reactor unit designed to operate at 500 lb. pressure when



Petrochem Barge Loads For River Trip

This petrochemical barge moves methanol, acetone, propylene glycol and several other solvents from the Bishop, Tex., plant of Celanese Corporation of America, to the Chicago area. The barges are loaded at the Corpus Christi terminal from Chemcel tank cars, and then move through the Intercoastal Canal to New Orleans, up the Mississippi River to St. Louis and into the Chicago Terminal via the Illinois Waterway canal.

processing heavy naphtha for octane improvement and at 250 lb. pressure when processing superfractionated light naphtha for production of aromatics.

The Lake Charles refinery was put on stream in 1941 with a daily capacity of 10,000 bbl. This capacity later was expanded to 12,000 bbl. and remained at this figure until the recent expansion and modernization was finished.

Gulf Oil Drilling

Texas offshore well below 535 ft.; Stanotex testing

HOUSTON.—Activity in the Texas tidelands last week was highlighted by Gulf Oil Corp. drilling below 535 ft. on its wildcat off Mustang Island and Standard Oil Co. of Texas continuing tests on its discovery well off Padre Island.

Gulf's well, which is the firm's first venture in the Texas tidelands, is on high-priced Tract L-774, 8½ miles from shore on state-owned land. It is being drilled from a platform standing in about 67 ft. of water off Nueces County. Gulf paid $3,068,000 for the 5,760-acre block at a tidelands lease sale last December.

Gulf plans to set 20-in. conductor string to 625 ft., and 13⅜-in. casing to 2,500 ft. A 9⅝-in. string will be run below the 2,500-ft. depth.

Stanotex testing . . . The Stanotex well, which is the first commercial discovery off Texas, was reported flowing 348 bbl. daily of clean 39.5°-gravity oil from a 12/64-in. choke on a 24-hour test. The well is 1½ miles off Kleberg County.

The pay is from the upper Frio through perforations from 7,760-66 ft. Seven-inch casing is set at 9,500 ft., and total depth is 9,980 ft. The well is located on 53 State Tract 948.

It has been reported the company will start soon on three directional wells that can be drilled from the platform. Stanotex already has announced it will drill another wildcat in the Sand Hills area 3 miles off Padre Island.

MEETINGS

Exploration Meet Planned

NEW YORK.—G. M. Knebel, head of the exploration department of Standard Oil Co. (N.J.), has been placed in charge of the committee organization arranging for next spring's joint annual meeting of the industry's three exploration societies in New York.

The societies, The American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, will meet March 28-31 at the Statler Hotel.

The name, New York Oil Finders' Convention, has been given the meeting. Its theme will be "The Habitat of Oil in the Sedimentary Basin." The A.A.P.G. members will hear a number of papers on the various petroliferous basins of the world. These will bring out reasons why oil occurs where it does. The other societies' programs will tie in with the general theme.

The meeting is being held for the first time in New York, and a larger-than-usual attendance from abroad is expected.

A.S.M.E. Program

Petroleum division meeting scheduled for Los Angeles

LOS ANGELES.—The technical program for the ninth annual Petroleum Mechanical Engineering Conference, sponsored by the Petroleum Division, American Society of Mechanical Engineers, was announced here this week by O. L. Lewis, division chairman.

The meeting will be held in the Statler Hotel, Los Angeles, September 27-29. There will be 18 sessions covering all branches of the petroleum industry. The sessions and scheduled dates are as follows:

Monday, September 27

Sessions: Mechanical Features of New Refining Processes, Underground Engineering, Pipeline Design and Operation, Refining Utilities, Welding of Drill Collars, and Oil and Gas Transmission Lines, Application of Code for Pressure Piping.

Tuesday, September 28

Sessions: Refining Maintenance, Tubular Goods in Production, Construction Materials, Refinery Piping Code Forum, Drilling Operations, and Storage and Transmission of Hydrocarbons.

Wednesday, September 29

Sessions: Refining Mechanical Design, Slush Pump Operation, Materials for Corrosion Protection and Prevention, Unfired Pressure Vessel Forum, Production Equipment, and Oil and Gas Pipeline Station Equipment.

Natural-Gas Briefs

OMAHA.—Northern Natural Gas Co. has applied to the Federal Power Commission for authority to build facilities to supply 12 million cubic feet of natural gas a day to Allied Chemical & Dye Corp. for use in its La Platte, Neb., fertilizer plant. Northern proposes to construct 9 miles of 30-in. pipeline north of its Clifton, Kans., compressor station and add one 2,000-hp. unit at its Sunray, Tex., station. The additions will cost $1,396,000.

COLUMBUS, Ohio.—Ohio Fuel Gas Co. has received Federal Power Commission permission to construct 24½ miles of 20-in. pipeline in Richland and Crawford counties, Ohio. The pro-

Standard of Indiana Opens New Research Lab

In a move designed to bring its research employes closer to its 220,000-bbl. refinery here, Standard Oil Co. of Indiana built this large laboratory at Whiting, Ind. The present staff of the company's engineering research department includes 90 members whose skills cover metallurgy, physics, applied mathematics, electronical, chemical, and civil engineering.

posed new line, which will cost $1,072,000, will enable the company to transport up to 66,700,000 cu. ft. of gas per day from the Weaver underground storage pool in Richland during the 1954-55 winter season.

OWENSBORO, Ky. — The Federal Power Commission has authorized Texas Gas Transmission Corp. to construct new pipeline facilities in Louisiana to enable it to receive additional natural gas from two subsidiaries. The new additions, estimated to cost $1,596,140, will include 24 miles of 16-in. pipe, a 2,000-hp. compressor unit, and a gas purchase meter station. The new compressor will be located at an existing station near Bastrop, La., and the new line will be laid in Acadia Parish, Louisiana.

PHILLIPSBURG, Kans. — Kansas-Nebraska Natural Gas Co. has received Federal Power Commission authority to construct 40 miles of line and add 1,200 hp. to present compressor stations in its system in Kansas and Nebraska.

OKLAHOMA CITY. — Cities Service Gas Co. has filed an application with the Federal Power Commission for authority to add to its existing system in Kansas. The company proposes to build 13 miles of 16-in. pipeline from its existing 20-in. line in Labette County to the electric generating plant of Kansas Gas & Electric Co. The company will sell the gas to K. G. & E. for use in a power plant near Parsons. The estimated cost of the additions is $285,000.

MID-CONTINENT

Pipeline Contracts Awarded

KANSAS CITY.—Great Lakes Pipe Line Co. has completed the first section and awarded contracts for the last section of its 714-mile expansion program.

R. H. Fulton & Co. finished the first section of the program, a 132-mile, 8-in. line from Nebraska City to Doniphan, Nebr.

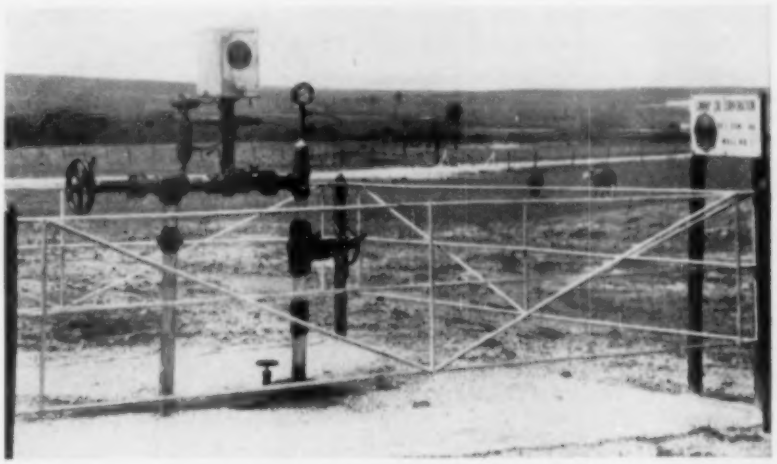
Fulton also has been awarded 83 miles between Alexandria and Rosendale, Minn. Associated Pipe Line Contractors, Inc., of Houston was awarded the 80 miles of line between Rosendale and Rosemount, Minn.

Natural-Gasoline Line Set

TULSA.—Mid-Continent Pipe Line Co. has announced it will construct a 14-mile spur to connect its system with Signal Oil & Gas Co.'s new natural-gasoline plant in Carter County, Oklahoma.

George W. Davis Welding & Construction Co., of Oklahoma City has been awarded the contract and expects to have the work finished by next week.

Mid-Continent, one of the pioneers in transporting gasoline with crude oil in the same line, will handle the total output of 1,000 bbl. daily of gasoline produced by the Signal plant.



SUNRAY'S NO. 1 WELL, northeast Little Chief field.

Skeptics Wrong on Little Chief

TULSA—There are always skeptics who say there's no oil left and often those who prove them wrong.

Northeast Little Chief field, on the southeast flank of the Burbank field in Osage County, Oklahoma, is an example of what can happen after "all the oil's gone."

Sunray Oil Corp. drilled its discovery well in mid-1952 after skeptics said the area had played out. Today the field has 77 producing wells and an average daily production of 1,905 bbl. Cumulative production at the end of 1953 was 478,000 bbl.

The field wells produce from the Burbank (Pennsylvanian) sand from a depth of 2,800 ft. It is a relatively thick sand body but one with very low permeability which responds favorably to hydraulic formation fracturing. All the Sunray wells are flowing and had initial potentials ranging from 400 to 500 bbl. daily.

According to engineers, the biggest well in Osage County, the Oras A. Shaw 1 Firrel, northwest discovery well at Little Chief, produced 2,700 bbl. in May and was shut in *(For detailed story and map of the area, see The Oil and Gas Journal, May 24, 1954, page 126).*

BIGGEST WELL in Osage County is the Oras A. Shaw 1 Firrel.

Italy Squeezes Jersey

Restrictive new law prompts sale of Po Valley producing, refining operations by Jersey Standard Italian affiliate

STANDARD OIL CO. (N. J.) has given up its small producing and refining operation in northern Italy because of the Italian law favoring state-controlled companies.

Jersey Standard's Italian affiliate, Esso Standard Italiana, has sold its 61 per cent majority interest in Soc. Petrolifera Italiana, to Italian interests represented by Dr. Domenico Sartirana and Dr. Achile Rivolta, both of Milan.

Jersey Standard purchased control of S.P.I. in 1927. The company had been operating in northern Italy for 22 years previously. Its present operations consist of about 60 bbl. daily production, together with some gas, from three fields in the Po Valley. In addition, it has a 2,200-bbl. daily capacity refinery at Parnova Taro (Parma) which has been running only about 400 bbl. daily. The company's fields are Vallezza Mont. Do. (oil and gas), Vizzola (oil and gas) and Montalbano (gas). The company has 1,900 acres proved and 146,605 acres unproved.

The company has for years hoped for a change in the official Italian policy which would allow full-fledged exploration by private capital. The Fornova refinery was destroyed by bombing during the war, but rehabilitated after the company returned in 1946. Some exploratory work was carried out on the undeveloped acreage held. By last year, the debts contracted during the expansion had been paid, and S.P.I. was showing a profit.

Italian law restrictive . . . Italian law 136 setting up the over-all state oil organization, Ente Nazionale Idrocarburi, killed any possibility of widespread exploration by private companies in the Po Valley. This law gave E.N.I. exclusive rights in the region, geologically the most promising in Italy, and restricted existing private operators to acreage already held. The law required these concessionaires to supply any useful geological or geophysical information to the government and limited any pipeline construction to a radius of about 6 miles around each concession.

In this situation and under the uncertainty prevailing previously, S.P.I. has been virtually inactive. Some of its rigs had been rented to Italian interests for use in exploratory drilling in southern Italy and for drilling for underground steam. Earlier this year, S.P.I. reached an agreement with E.N.I. to operate Montalbano field as subcontractor to E.N.I. Jersey Standard interests did not accept the offer for purchase of its S.P.I. stock until the same price—2,080 lira, or about $3.25, a share—was offered minority shareholders. The market value of the shares in Italy rose sharply when the offer became known.

Refining retained . . . Even though the sale ends Jersey Standard's producing activities in Italy, the company still retains extensive refining and marketing operations. Through Stanic Industria Petrolifera, S.p.A., which it owns 50-50 with an Italian Government company, Jersey Standard has an interest in 62,000 bbl. daily of refining capacity at Bari and Livorno, while Esso Standard Italiana handles its marketing and export sales.

Eugene Holman, board chairman of the Jersey company, said recently in an interview in Rome that it appears the Po Valley is far from being fully explored, and that if a real opportunity for exploratory work should be offered a number of companies, the chances were good for important discoveries of commercial oil production.

Commenting on the fact that Italian refining capacity now considerably exceeds Italian consumption, Holman said this problem could be solved through an increase in consumption in Italy and other Mediterranean countries. He emphasized the depressing effect of high gasoline prices in Italy, two-thirds of which is due to the taxes. The Italian Government, however, recently announced a further increase in the tax on gasoline in order to finance new road construction.

Progress Made in Iran

Management board membership settled, rate of production next major hurdle facing negotiators at Teheran session

THE knotty management issue which has been holding up an Iranian oil settlement was partially resolved last week when the negotiators agreed that two of the seven members of the board of the Dutch registered operating company will represent Iran.

Representatives of the eight-company international oil consortium and Iranian Government officials were expected to work out remaining details of the plan of operation by the end of the week.

The division of the board—two to Iran and five to the consortium—appeared to assure effective control of operations for the companies which have undertaken to make the investment and provide the market outlets necessary to reactivate the Iranian oil industry.

Reports from Teheran where the negotiations are taking place said the consortium representatives stood firm against Iranian demands for a majority of the board. It was not clear if there were other provisions of the agreement modifying the consortium's control in a way to meet requirements of Iran's oil nationalization law.

Rate of production . . . Next problem due to be thrashed out is the rate of production. The Iranian negotiators have been pressing for an assured 300,000 bbl. daily average the first year against about 200,000 bbl. daily proposed by the consortium. Indications were the consortium may agree to the 300,000 bbl. daily. This would be stepped up over the next 3 years to the maximum output possible.

The consortium companies, however, offered less for the Abadan refinery which has largely been replaced by other facilities built elsewhere. Even at the end of 3 years, it is expected to be possible to raise throughput of the refinery to only 250,000 bbl. daily, about half its former runs.

Other issues are expected to be quickly settled once the two sides come to terms on the management issue.

Compensation for Anglo-Iranian . . . However, British and Iranian negotiators are discussing the question of com-

pensation for Anglo-Iranian Oil Co., Ltd., and this problem also must be settled before operations can resume.

Anglo-Iranian has shelved its claim for future profits covering the unexpired term of the cancelled concession which ran to 1993. However, the company is continuing to press for compensation for losses incurred as a result of the nationalization during the last 3 years. The renunciation of Anglo-Iranian's claim for losses due to future profits was described in London partly as a gesture of good will to Iran and partly because of arrangements between Anglo-Iranian and other members of the consortium.

Gas Reserves Gain

Venezuelan figures higher as injection increases

VENEZUELAN gas reserves showed a substantial increase in 1953 after 6 years of mainly deficits.

The reserves were figured at 18.2 billion cubic feet at the beginning of 1954, the highest figure since 1948 when the total was 22 billion cubic feet. Reserves at the beginning of 1953 were estimated at 15.4 billion cubic feet.

Of the gas produced last year, 23.4 per cent was utilized and the remainder flared. In 1952, only 17 per cent was used. The Ministry of Mines and Hydrocarbons hopes that by the end of 1954 30 per cent of the gas produced will be used.

It is certain that gas waste will be reduced more in future years. The latest projected step in this direction is a government-sponsored petrochemical plant, which will be situated in eastern Venezuela, and will produce agricultural fertilizer.

Only about 35 million cubic feet per day of gas is being used in Venezuela as industrial or domestic fuel, aside from that used by the oil companies themselves. Space-heating furnishes no market, due to climate, and industrialization in Venezuela does not yet demand large quantities of gas.

The greatest amount of gas consumed is used by reinjection or pressure-maintenance plants, of which there are 17 now in operation or under construction.

Among the latter is Creole Petroleum Corp.'s installation in Lake Maracaibo, which will return 137 million cubic feet per day to the Eocene B-6-X reservoir of the LL-370 area of the Bolivar Coastal fields. This will be about four times as big as the biggest plant presently operating in Venezuela, and the largest such operation in the world.

About 300 million barrels of otherwise unrecoverable oil have been added to Venezuela's ultimate reserves by such projects, the ministry calculates.

New plants . . . New plants and important extensions added during 1953 included the following: (1) for reinjection to the L-4 sand of Chimire field, 35,000,000 cu. ft. per day, plant operated by Mene Grande Oil Co. for itself, Creole and Socony-Vacuum Oil Co., Inc.; (2) extension of Phillips Petroleum Co.'s plant at San Roque field to bring capacity up to 25,000,000 cu. ft. per day reinjected to the Colorado A and C sands; (3) Mene Grande's plant in Nipa field, returning 5,500,000 cu. ft. per day to the G and L-2-M sands.

The water-injection plant also was placed in operation in 1953 by Shell to flood a portion of Cabimas field with 6,000 bbl. of water per day. Creole began similar experiments at Jusepin.

The first phase of an operation whereby 12,000,000 cu. ft. per day will be returned to the subsurface in Mapiri field was inaugurated by Mene Grande in December. The same company is also planning similar installations in Boca, Dacion, La Vieja, El Toco, and Santa Rosa fields.

A byproduct of the establishment of pressure-maintenance plants in the last decade has been the recovery in stabilization plants of natural gasoline from the gas.

The natural gasoline may be exported as such, submitted to further refining in Venezuela, or injected into the crude stream to raise its gravity.

There are 11 stabilization plants now in operation, ranging in capacity from Creole's small plant at Cumarebo (State of Falcon), which processes about 5 million cubic feet a day and extracts 110 bbl. of natural gasoline per day, to Mene Grande's West Guara (State of Anzoategui) installation, handling 50 million cubic feet of gas per day and recovering 1,400 bbl. of gasoline.

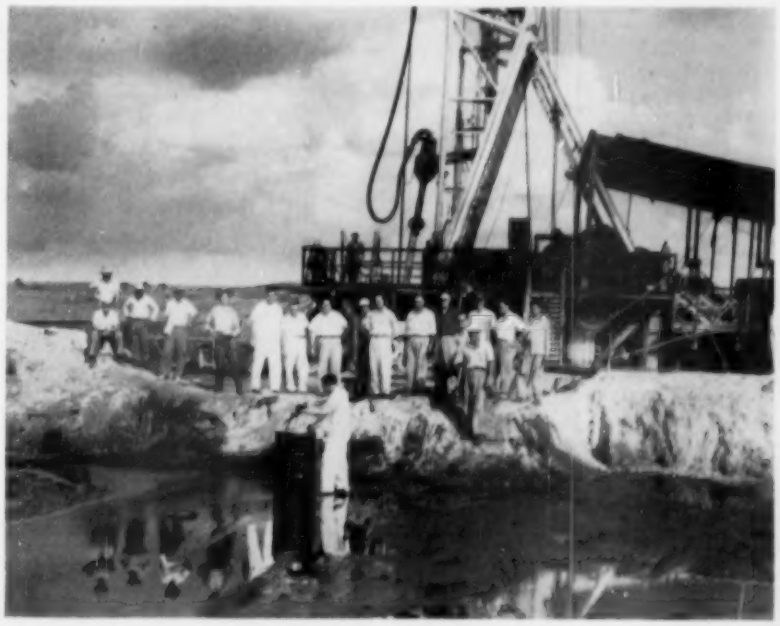
The average recovery factor for all 11 plants is about 1.5 gal. per M.c.f. Additions to plant last year hiked the factor from 1.298 gal. per M.c.f. at the beginning of 1953 to 1.560 in December.

Natural gasoline recovered by stabilization rose last year from 266,000 bbl. in January to 326,600 in December. Total for the year was 3,463,000 bbl., of 145,446,000 gal.

I.P.C. Wildcat Is Big

Another Middle East oil discovery of possible major proportions has been reported in Iraq.

Iraq Petroleum Co., Ltd., found production at a depth of around 5,700 ft. in a wildcat on the Tauq structure on



Cuban Rig To Drill More Exploratory Wells

This National 75 rig owned by Cuban independents and operated by Kerr-McGee Oil Industries, Inc., personnel drilled the Jatibonico wildcat which sparked new oil interest in Cuba recently. The rig may be used to drill a deep test in the same area in the near future and several more exploratory wells are planned to evaluate the discovery. The well, which is producing 115 bbl. daily, is located on a 29,000-acre concession owned by Compania Refineria de Cabaiguan, S.A. Kerr-McGee has an option on a one-quarter interest in both the well and the acreage block but the option has not yet been exercised.

the Jambur fold about 25 miles southeast of Kirkuk field.

After finding gas in the upper part of the limestone, the company tested oil at a reported rate of 17,000 bbl. daily. The crude was described as 41° gravity and sweet.

The well was Jambur 2, drilled as a part of I.P.C.'s continuing exploration program in its concession area in this important Middle East oil country. The location is to the east and apparently on the same line of folding as the company's Bai Hassan well which some months ago tested around 10,000 bbl. daily.

Virtually all of Iraq is held under concession by I.P.C. and its two associated companies, Basrah Petroleum Co., Ltd., in the south, and Mosul Petroleum Co., Ltd., in the north. Kirkuk field, one of the largest reservoirs in the Middle East, now produces around 500,000 bbl. daily which is moved by pipeline to a terminal at Banias, Syria, on the eastern Mediterranean.

Turk Soothes Fears

Official declares national company won't be favored

A HIGH Turkish Government oil official has given assurances that private companies need have no fear the choice exploration acreage in Turkey will be preempted by the new national oil company.

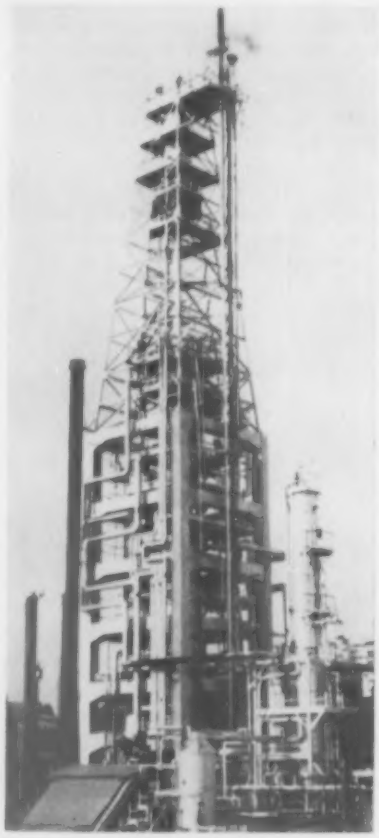
The official is Dr. Enver Necdet Egeran, deputy director of the petroleum department in the ministry of development. He arrived in New York the latter part of June for a stay of several weeks during which he will confer with Max Ball, Washington consultant, on regulations to Turkey's new oil law.

This new Petroleum Corporation of Turkey, in which the government must hold 51 per cent of the stock, will take over Ramandag and Garzan fields in southeastern Turkey and operate them to supply the 6,500 bbl. daily refinery which Ralph M. Parsons Co. is now building for the government in the producing area. To encourage investment in the company, the government is guaranteeing a 6 per cent profit for 5 years.

The Turkish official, who received a geological and technical education in France, indicated everything reasonable would be done to facilitate maximum exploration activity by private companies. Some small points which companies are now raising can be clarified in the regulations; others may have to be ironed out by obtaining an interpretation from the legislature assembly, a procedure provided under Turkish law.

Completion . . . Outside Ramandag, Garzan, and possible, Resandag, the new national company can compete for other areas against private company applicants. The basis on which these applications will be decided is: (1) capital available, (2) national interest, (3) technical ability, and (4) previous experience. Even though the national company might be ahead from the standpoint of national interest, other considerations would favor better financed and more experienced private-company applicants.

At present, five foreign companies are conducting geological studies of Turkey and have indicated their intention of taking full-fledged exploration concessions when the filing period is opened at the time of the promulgation of the regulations, probably late this fall. These companies are: Standard Oil Co. (N.J.), Socony-Vacuum Oil Co., Inc.; Royal Dutch-Shell; American Overseas Petroleum, Ltd. (Caltex); and Kern Oil Co., Ltd., a British company with intersts in California and Trinidad.



"Midget" Cat Cracker

This is one of the two "midget" T.C.C. catalytic cracking units built at the Rome and Genoa refineries of Permolio, S.p.A., an independent Italian refining company. The units were designed to run 1,210 bbl. per stream day of gas oil from Middle East crude, plus 420 bbl. daily of recycle while burning 1,100 lb. per hour of coke. Design was by Foster Wheeler Corp. This unit is at the Rome refinery which has a 9,000-bbl. daily crude capacity.

Japanese to Build Tankers

Contracts for four large tankers for delivery late next year or early in 1956 have been placed with shipbuilding yards in Japan.

Castella & Co. and Hydrosa Co. of Panama, both affiliated with Western Shipping Corp. of New York, have ordered two 32,000-ton tankers from the Harima Shipbuilding & Engineering Co., and Trans-Ocean Marine Co. of Liberia, affiliated with Transocean Carriers Co., New York, has contracted for a 34,000-ton vessel from Japan Steel Tube Co., Ltd. A 35,000-ton tanker has been ordered by Soc. Maritima San Nicolas, S.A., from Mitsui Shipbuilding & Engineering Co.

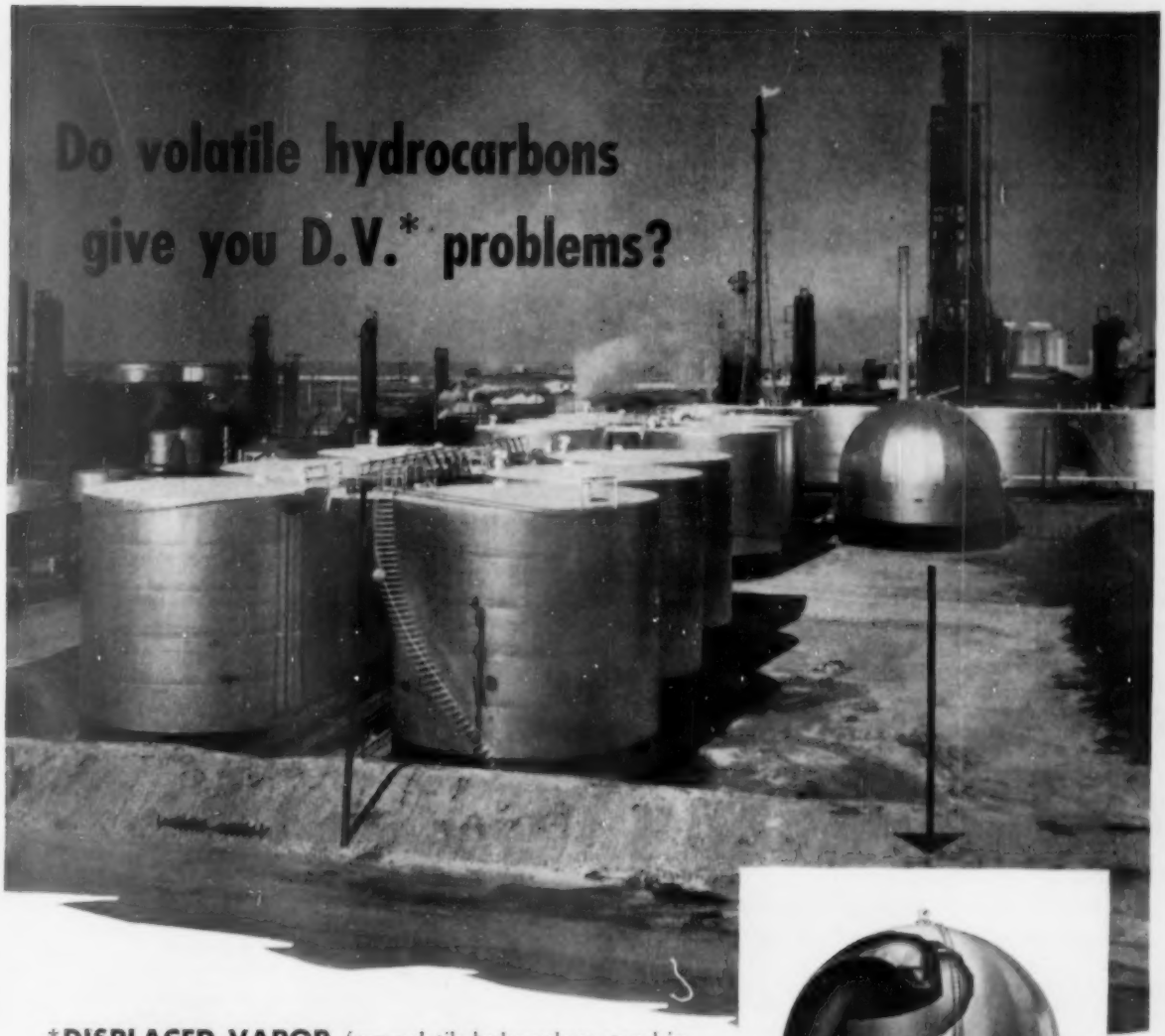
According to reports in shipping circles, the vessels will be built for about around $123 a deadweight ton, less than half the construction cost in American yards. The current over-supply of tanker tonnage is being reflected in diminishing orders for new vessels, accelerating the trend toward construction in lower-cost foreign yards.

International Briefs

Marine fuel oil sales of Standard Oil Co. (N.J.) in the Eastern Hemisphere have been turned over to a newly created affiliate, Esso Export, Ltd. Outside the United Kingdom and Eire, the new company took over operations formerly conducted by British Mexican Petroleum Co., Ltd. Esso Export, Ltd., has headquarters in London as an associate of Esso Export Corp., Jersey Standard's international marketing affiliate. Eric G. Lindroth heads the new company as chairman of its board.

Refineria de Petroleos de Escombreras, S.A., is planning further expansion of its 30,000-bbl. daily refinery near Cartagena, Spain. A throughput of 1,750,000 tons (about 35,000 bbl. daily) is anticipated this year. A second stage of expansion also is now under study. This would cost about $6,000,000 and raise refining capacity to 60,000 bbl. daily. The company is controlled by the Spanish Government with Caltex holding a minority 24 per cent interest.

(Continued on page 180)



Top: A 50,000-cu. ft. Horton Vaportank and some of the sixteen fixed roof tanks to which it is interconnected, at the Taylor Oil and Gas Company refinery, Corpus Christi, Texas. Above: Cutaway view of a Horton Vaportank showing the flexible membrane.

***DISPLACED VAPOR** from volatile hydrocarbons stored in fixed-roof tanks need not be vented to the atmosphere. A Horton Vaportank can save that vapor—and save you money.

The Vaportank is an independent vapor storage unit that can be interconnected to one or more fixed roof tanks by large diameter vapor piping. As the central storage unit in a vapor saving system, the Vaportank has a flexible hemispherical membrane attached to the top of its vertical shell. Vapor displaced from interconnected tanks by increasing temperature or filling is stored under the flexible membrane. As long as the capacity of the Vaportank is not exceeded, no vapor is vented to the atmosphere. When conditions causing the displacement are reversed the vapor returns to the tanks.

Further information, estimates or quotations on Horton Vaportanks, or any other Horton® vapor saving structure, may be obtained by writing our nearest office. There is no obligation on your part.

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Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. General Justo 275, Grupo 306, Rio de Janeiro, Brazil

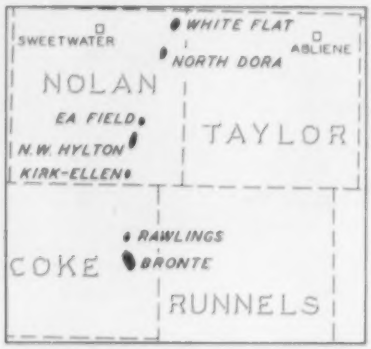
THE OBJECTIVE . . . Prolific reserves are forecast for the porous and permeable Cambrian sandstone. This core from a Bronte field well, Humble B-4 Brunson, at 5,325 ft.

THE TOOL . . . Field development and wildcat wells are increasing as the search intensifies. Most contractors use a jackknife rig such as this one. (Courtesy Humble).

Good Pays, Sure Profits, Lure Drilling to Texas' Cambrian Trend

Second of two-part discussion. See last week's issue for description of exploratory phases

by Norman S. Morrisey
Drilling-Development Editor



THE LOCALE . . . Here is the area where operators are tapping the prolific pay sands of the Cambrian trend. Fig. 1.

DRILLING on the Cambrian trend of Coke and Nolan counties, Texas, has attracted operators because of the prolific pay sands and relatively inexpensive digging.

Favorable economics with a high ratio of profit to investment and short-term payouts have caused lease prices to skyrocket and no acreage is open along the 50-mile strip. Farmout deals carry high overrides because of the estimated high reserves and multiple pay horizons.

Most of the fields on the trend produce from several zones in the Strawn and from the Ellenburger in addition to the Cambrian (Table 1). Many of the wells are dually completed, although some operators prefer to drill twin wells.

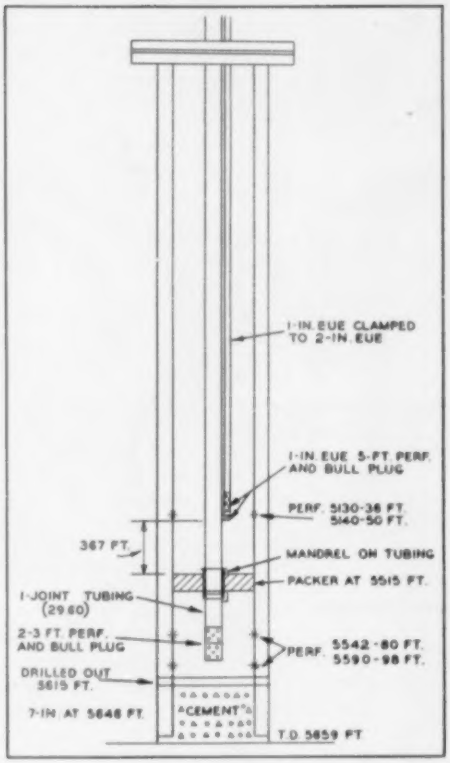
Costs . . . Cost of a completed 6,000-ft. Cambrian field well is about $60,000 to $70,000, or roughly $10 per foot, including the tank battery. Drilling costs are now fairly uniform at $4.75 per foot and have dropped about 50 cents per foot during the past year because of the competition. Day work originally cost $650 to $700 but has dropped to $600 to $650 per day.

Reserve estimates are a closely guarded secret among the operators on the trend. Ultimate recoveries, however, will probably be very high, because limited data indicate that the fields may have an active water drive.

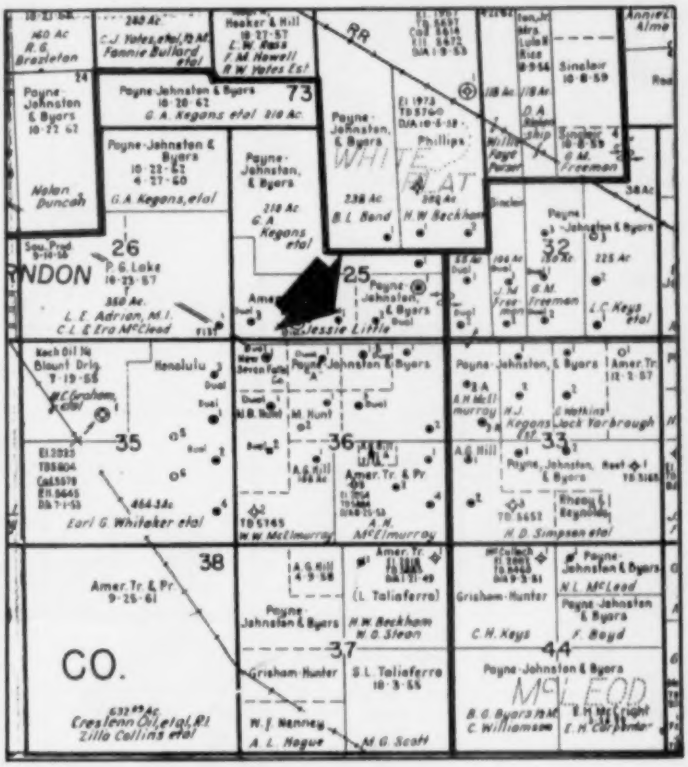
Principal drilling problem is lost circulation in the Strawn reefs and in the Ellenburger and Cambrian dolomite; locally, caving of the Smithwick (Bend) shale slows down operation and may even cause the drill pipe to stick. Occasionally crooked holes are a problem, especially in the reef section.

Completion practices . . . Most of the fields on the Cambrian trend have multiple pay zones and frequently operators dually complete the wells. Customary dual-completion practice is to drill through the Cambrian and set pipe. After perforating upper and lower pay zones, the operator sets 2-in. tubing with packer. The lower zone is produced through the tubing and the upper zone through the annulus. Some operators set pipe on top of the pay and produce the Cambrian "barefoot."

However, Honolulu Oil Corp. at White Flat sets 7-in. casing through the Cambrian pay and perforates the Strawn and Cambrian pay intervals (Fig. 2). They then set a retainer-production packer between these zones and run 2-in. tubing into the lower zone. One-inch tubing is clamped to the 2-in., and the operator produces the upper zone through the 1-in. tubing. Honolulu plans to redesign the head so that



DUAL COMPLETION . . . Honolulu Oil Corp. uses this type of dual completion at White Flat field. Upper zone is produced through the 1-in. tubing and the lower zone through the 2-in. Fig. 2.



DISCOVERY . . . First Cambrian production (arrowed) in West Central Texas was established at White Flat in June 1953. Since then, 14 Cambrian wells have been brought in. (Courtesy Midland Map Co.) Fig. 3.

both the upper and lower zones can be pumped during the late life of the field.

Producing Fields

White Flat . . . Cambrian production was first established in White Flat field in northeastern Coke County in June 1953 (Fig. 3). Since that time there are 10 Cambrian sand wells and 4 Wilberns (?) dolomite producers. Thickness of the pay zones is extremely variable due largely to erosion and distance above the oil-water contact. American Trading & Production Corp. 2 Little has the highest initial potential to date in the field, with 1,870 bbl. per day from the Cambrian dolomite.

White Flat field at Cambrian level is an elongate anticline with about 300 ft. of closure; the structure in the Pennsylvanian beds shows only 150 ft. of closure. There is a major fault with about 500 ft. of throw along the east side of the field that parallels the crest of the structure. This fault is upthrown on the west. Mississippian or Bend sediments are preserved on the eastern or downthrown side, while on the crest of the structure Cambrian sand is in contact with the Strawn.

Average depth to the producing zone at White Flat is 5,700 ft. and the oil-water contact is found at 3,616 to 3,638 ft. subsea.

North Dora . . . Skelly Oil Co. 3-B Boyd was the first Cambrian sand producer at North Dora field with an initial potential of 1,987 bbl. per day from 125 ft. of porous and permeable sand (Fig. 4). The field lies in Sections 58, 59, 62, and 63, Block 20, T. & P. Survey, in northeastern Nolan County (Fig. 5).

At Pennsylvanian level, North Dora is a weakly defined anticline caused in part by differential compaction over a reef and over the Cambrian high. In the Cambrian, it is a narrow anticline with Ellenburger eroded off its crest and with a fault along its eastern flank.

North Dora has about 132 ft. of closure in the Cambrian sand above the oil-water contact at 3,684 ft. subsea, and the field has been defined on the west side by a dry hole in the Cambrian, Skelly Oil Co. 4-B Boyd. This well was plugged back and completed in the Ellenburger for an initial potential of 784 bbl. per day at 47° gravity crude.

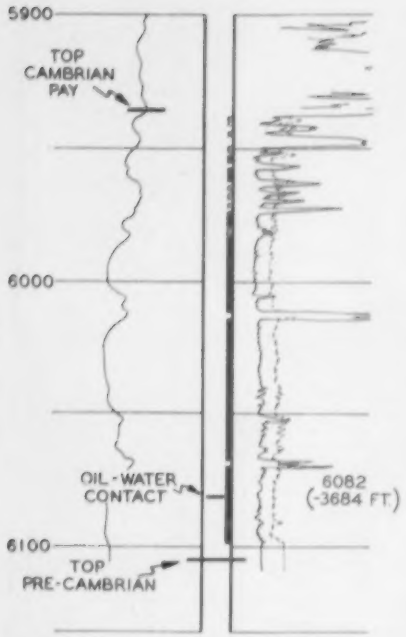
At the present time five wells are completed in the Cambrian, with 200 acres proved. In addition, the field produces from the Wilberns, Ellenburger, and Caddo. Best Cambrian well to date is the Skelly 5-B Boyd with an indicated initial potential of 2,335 bbl. per day from perforated interval 6,090 to 6,154 ft.

E. A. Cambrian . . . Kilroy Co. of Texas 1 C. J. Roberts discovered Cambrian sand production at E. A. field with an initial production of 1,293 bbl. of 52°-gravity oil from 51 ft. of pay. Acreage around this well commanded premium bonus payments and Humble Oil & Refining Co. and British-American Oil Producing Co. each acquired 160 acres offsetting the 1 Roberts for record prices on the trend.

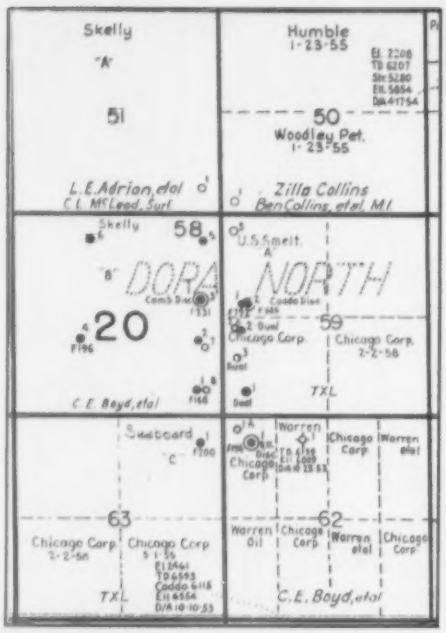
E. A. now has seven producers, and development wells are watched closely. Humble is completing an Ellenburger (?) discovery, the 1 Petty, about 1½ miles north of the field. On tests this well flowed oil at the rate of 54 bbl. per hour from 6,087 to 6,138 ft.

Depth to the Cambrian sand at E. A. is about 6,069 ft., and the oil-water contact has been established at 3,614 ft. subsea.

Present limited subsurface data indicate that the structure at E. A. will be similar to White Flat and North Dora, i.e., a sharply folded pre-Pennsylvanian



125 FT. OF PAY . . . Skelly Oil Co. completed its 3-B Boyd, Cambrian discovery for North Dora field, for an initial potential of 1,987 bbl. of 47°-gravity crude from 125 ft. of pay. Fig. 4.



LIMITS ESTABLISHED . . . Downdip limits of Cambrian production were established by Skelly Oil Co. 4-B Boyd, with the oil-water contact at —3,684 ft. (Courtesy Midland Map Co.) Fig. 5.

Rawlings . . . Rawlings, originally called North Bronte, is an elongate north-south trending anticline with at least 400 ft. of closure on the unconformity. In the Cambrian beds it is a very sharply folded anticline with a major fault along its east flank. Strawn sediments weakly reflect the Cambrian structure and have about 120 ft. of closure.

Rawlings was originally located on the basis of seismic work in 1952 and the discovery well, Humble 1 M. A. Rawlings, was completed in a Strawn limestone for an initial potential flow of 298 bbl. of 50°-gravity crude. Subsequent development led to Cambrian-dolomite production in the Humble 3 Butner completed for 483 bbl. per day from perforations at 5,541-53 ft.

Rawlings, like most of the fields on the Cambrian trend, is a multipay pool and now produces from six horizons.

anticline with a fault along its east flank.

Hylton Northwest . . . Hylton Northwest is the newest addition to the Cambrian producing areas with the completion of Seaboard Oil Co. of Delaware 5-A Hanks for an initial potential flowing of 381 bbl. per day.

Hylton was originally discovered in 1951 by Seaboard with its 1 Hanks, completed on October 11, 1951, in the Stevens (upper Strawn) zone after drilling to total depth of 6,363 ft. in the Ellenburger and testing dry in this formation. Subsequent development shows that the field is an elongate low-relief anticline at Strawn level, 2 miles long and ¾ mile wide, and has 150 ft. of closure.

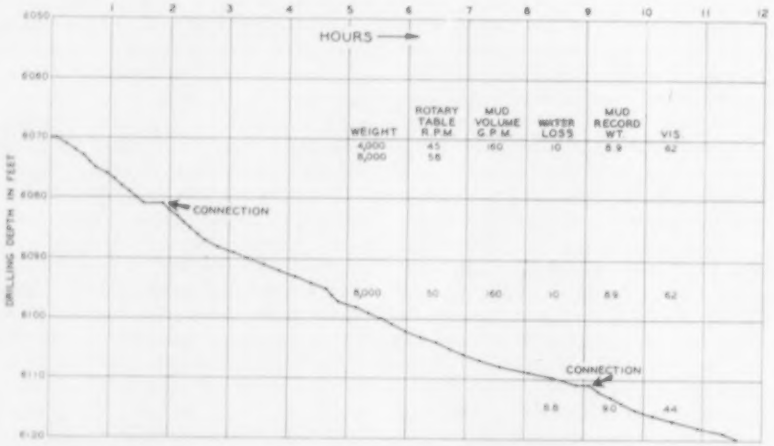
At Cambrian level, Hylton Northwest is unusual because it has been deeply eroded and Pennsylvanian beds are in direct contact with pre-Cambrian metasediments. As a consequence, future Cambrian production may form a halo around the "bald" anticline. Several tests on the east side of the field have penetrated pre-Pennsylvanian beds and indicate that Hylton Northwest will be a typical Cambrian field. The oil-water contact in the Cambrian has been defined at 3,622 ft. subsea.

Discovery of Hylton and the later drilling of the 5-A Hanks was based upon core drill, gravity, and subsurface data.

Kirk-Ellen field . . . Age of the dolomite producing zone in Kirk-Ellen field has not been definitely identified, but probably is equivalent to either the Ellenburger or Wilberns. The discovery well, Neville C. Penrose, Inc., 1 Kirk, was completed for an initial potential flowing of 479 bbl. per day from perforations at 6,268-73 ft. with a gas-oil ratio of 410. Woodley Petroleum Co. has drilled a northeast offset to the 1 Kirk and is an indicated producer. With only two wells in the field, it is impossible to determine the structure at Kirk-Ellen.

Bronte . . . Bronte lies 4 miles south of Rawlings and is on the same structural trend. Hickok & Reynolds 1 E. C. Rawlings, the discovery test, was located on the basis of core-drill and seismic work and completed in August 1948. Since this well was brought in as a Palo-Pinto limestone producer, 80 wells have been drilled on the structure with several additional pays.

First well completed in the Cambrian was the Humble 5 Keeney in April 1954, although wells had previously logged good shows in this zone. The Keeney flowed 414 bbl. of 52°-



DIAMOND CORING . . . During early stages of field development, most operators cored the Cambrian pay zones. Diamond coring time averages about 15 minutes per foot. (Data courtesy Diamond Coring, Inc., Abilene, Tex.) Fig. 6.

TABLE 2—TYPICAL MUD PROPERTIES FOR WELLS ALONG CAMBRIAN TREND
(Courtesy John T. Blaney, Jr., Baroid Service Engineer, Abilene)

Depth (ft.)	Mud wt., lb. per gal.	Funnel vis. A.P.I.	Gel strength, per cent Initial	Gel strength, per cent 10 min.	Filter loss	Cake, 32nd in. cc. A.P.I.	pH	Salt NaCl p.p.m.	Calcium ion
2,000	10.4	28	0	0	98	8	6.8	18,000	Very heavy
2,500	10.2	34	0	2	68	6	7.5	15,000	Heavy
3,000	10.0	36	0	4	45	5	8.3	13,000	Heavy
3,500	9.8	36	0	5	25	4	9.0	9,000	Med.
4,000	9.6	38	4	12	18	3	9.5	6,000	Trace
4,500	9.5	40	6	20	12	2	10.0	4,000	Trace
5,000	9.3	46	8	22	10	1	10	2,000	Nil
5,500	9.5	50	10	25	8	1	10	Nil	Nil
6,000	9.5	55	10	30	6.8	1	10	Nil	Nil
6,500	9.5	60	12	40	6	1	10	Nil	Nil
7,000	9.5	65	12	65	5	1	10	Nil	Nil
7,500	9.5	70	15	80	4.2	1	10	Nil	Nil

TABLE 3—MUD PROPERTIES BEFORE AND AFTER ADDITION OF DIESEL OIL

Mud properties—	Normal mud	Oil added
Weight, lb. per gal.	9.6	9.4
Viscosity, sec. A.P.I.	38	42
Initial gel, grams A.P.I.	4	8
10-min. gel, grams A.P.I.	12	20
Filter loss, cc. A.P.I.	13	9
Cake, 1/32-in.	3	2
pH, indicator	9.5	10.0

gravity crude in 18 hours from open hole between 5,334-46 ft.

Bronte is a prominent geological feature that is reflected in the near-surface Permian beds by at least 30 ft. of closure. In the Cambrian, the structure is much sharper and shows at least 1,000 ft. of relief; on the unconformity it has 200 ft. of closure with Cambrian sand in contact with the overlying Strawn.

Drilling Practices

Drilling on the Cambrian trend is relatively straightforward although occasionally crooked holes and lost circulation can be expensive problems. Contractors require 1 to 7 days to drill the surface hole and normally set 9⅝-in. surface pipe between 100 and 700 ft. in order to shut off Trinity and San Angelo water sands. It requires 25 to 30 days to reach the Cambrian at 5,500 to 6,000 ft.

During early development work, the pay was cored using diamond bits. Customary practice is to set the pay string at total depth just above the oil-water contact and perforate the pay zone. Wells in the sand are completed natural flowing through 2-in. tubing, or dually completed along with one of the upper pay zones.

Drilling time varies, depending upon the depth to the pay zones, but average wells require 30 to 35 days after spudding in. The number of bits also is subject to variation. A good rule of thumb used by contractors is to figure one bit per day and this will usually come within 5 to 10 per cent of the required number (Table 1).

Diamond-coring rates range from 6 to 30 minutes per foot with an average of about 15 minutes per foot (Fig. 6). Customary practice is to keep 4,000 to 8,000 lb. on the bit with a rotary-table speed of 45 to 60 r.p.m.

Contractors and drilling equipment . . . Among the contractors active in the area are: Great Western Drilling Co., Lauderdale & Straughan, Montex Drilling Co., Warren & Bradshaw, R.H.K. Drilling Co., Moutray-Moore Drilling Co., Fox & Son, and Rhea & Reynolds.

Diesel, butane, or natural gas is used as fuel and contractors use either pond water or drill a well.

Most of the rigs have jackknife masts and are capable of going to at least 7,500 ft. Rhea & Reynolds has three rigs operating. Each of these rigs is

(Continued on page 111)

TABLE 1—CASING PROGRAM AND DRILLING DATA ALONG CAMBRIAN TREND

Field—	White Flat	North Dora	E.A. (Cambrian)	NW Hylton	Kirk-Ellen	Rawlings	Bronte
Location	Sec. 25, 35, 36, Blk. 19 & 20, T&P RR. Sur., Nolan County	Sec. 58, 59, 62, 63, Blk. 20, T&P RR. Sur., Nolan County	Sec. 13, Blk. 2, T&P RR. Sur., Nolan County	Sec. 22, Blk. Z, T&P RR. Survey, Nolan County	W. E. McRorey Sur. No. 12 (½ mi. E. of Blackwell), Nolan County	Sec. 390, 397, Blk. 1-A, H&TC Sur., Coke County	Sec. 450, 453, 454, Blk. 1-A, H&TC Sur., Coke County
Total wells	43	10	7	23	2	11	80
Cambrian wells	14	5	7	1	2	2	2
Surface casing†:							
Diam. (o.d.)	9⅝ or 10¾ in.	9⅝ or 10¾ in.	8⅝, 9⅝, or 10¾ in.	8⅝ or 10¾ in.	10¾ in.	10¾ in.	10¾ in.
Casing seat	125-300 ft.	350-450 ft.	550-850 ft.	600-750 ft.	450-550 ft.	250-300 ft.	250 ft.
Cement (sacks)	100-125	200-300	400-500 (circ. to surface)	250-375	300-400	175	160-200
Oil string†:							
Diam. (o.d.)	5½ or 7 in.	5½ or 7 in.	5½ in.	5½ in.	5½ or 7 in.		
Casing seat	5,700 ft.	6,150 ft.	6,100 ft.	6,690 ft.	6,300 ft.	5,600 ft.	5,350 ft.
Cement (sacks)	200-400	200-400	200-400	150	150	750	550
Remarks	Centralizers above and below pay	Cement may break down lost circ. zone	Centralizers on bottom ¾ jts. Wall cleaners opposite pay.	Set 4-in. liner through Cambrian pay (O.W.D.D.)			
Days drilling time*	35	35	30	40	32	28	28
No. of bits*	28	34	28	40	29	31	31
Avg. depth to Cambrian	5,700	6,200	6,100	6,690	6,280	5,650	5,400
Prod. zones	Odom Strawn Caddo ls. Ellenburger Cambrian dol. Cambrian ss.	Caddo Ellenburger Cambrian ss.	Cambrian ss.	Strawn Cambrian ss.	Ellenburger (?)	Canyon ss. Palo Pinto ls. Goen ls. Cambrian dolomite	Palo Pinto ls. Goen ls. Gardner ss. Strawn ls. Cambrian ss.
Remarks		Lost circulation zone at 5,500 ft.			Age of producing zone uncertain		Complete Cambrian in open hole

*Courtesy Hughes Tool Co. †Courtesy Halliburton Oil Well Cementing Co.

Here's why rust control is needed . . .

THE presence of water, oxygen, and steel is a requisite for the formation of iron oxide. These materials are all available in product pipelines. The presence of the resultant iron oxides will soon be reflected in a degradation of product quality, reduced line efficiency, and an increase in line maintenance costs or even actual loss of capital equipment.

Mill scale usually leaves the line in particles of a relatively large size and is easily removed by basket strainers or settling in terminal tanks. In contrast, the iron oxide formed while the line is in service, especially when cut loose by scrapers, is finely divided and difficult to remove from the product. Capital expenditure for filters, or for increased terminal tankage to permit more settling time, is accompanied by an increase in labor costs for cleaning these facilities.

If rust is not removed from the product, it will inevitably cause complaints of clogged screens and nozzles of oil burners and filters ahead of injectors in diesel engines. In aircraft applications, the problem is more serious, in that there is not presently available a filter of acceptable capacity and pressure drop which will remove the rouge that can cause a failure of the fuel system in flight.

There is little question that fine rouge, not stopped by conventional basket strainers, takes its toll in terms of increased maintenance costs on meters, pump valves, impellers, etc.

The necessity for rust control is again strikingly apparent when the design capacity cannot be maintained because of increased line friction. It is also apparent when power costs mount as a result of attempting to maintain capacity by increasing pump pressures. Reasonably high efficiencies may be maintained in uninhibited lines by scheduling two or more pairs of scrapers a week.

Experience indicates, however, that the cost of such schedules, the expenses of handling large quantities of rust removed from such lines, and difficulties encountered in delivering clean product make this approach impractical.

New oil-soluble antirust agent gives

Lasting Protection for Products Pipelines

. . . but improvements are needed to obtain same degree of protection in static storage and tankers

by S. Kleinheksel, P. Lawrence, and F. L. Nelson

FIELD experiences with an oil-soluble antirust agent have shown that

- A products pipeline can be protected from internal corrosion indefinitely.
- Lines operating with appreciable down time will require higher dosages of additive than a line which operates continuously.
- Evidence that the introduction of such additives into a badly corroded line will cause rust lifting is varied and inconclusive. Proper precautions can, however, eliminate any difficulty from this source.
- There is no evidence that oil-soluble antirust agents alone will improve line C factor. However, a logical program of scraping plus additive will recover a loss in C factor caused by rust.
- The use of an oil-soluble antirust agent will maintain a high C factor without scraping.
- If an antirust agent is added to product at a certain point for any given reason, no further additions need be made to protect subsequent distribution facilities.
- While rusting in a dynamic or continuously turbulent system can be essentially eliminated, present experience demonstrates that further improvements are needed in order to obtain the same degree of protection in static storage and in the salt-water environment of tankers.

Authors are associated with Socony-Vacuum Oil Co., Inc., Kleinheksel is with the eastern pipeline division, Plainfield, N. J. Lawrence and Nelson are with Research and Development Laboratories, Paulsboro, N. J. Paper presented at A.P.I. Products Pipeline Conference, Philadelphia, May 10, 1954.

Methods of Rust Control

Removal or effective isolation of water or oxygen from the pipe surface will control rusting, as will suitable alteration of the water or pipe-wall surface.

In a closed system, such as a boiler, control of oxygen content by sodium sulfite is an effective means for controlling rusting. It is doubtful that the similar removal of oxygen from petroleum products can be successful or economical because of the large quantities of oxygen present. It has been reported that gasoline, saturated with air at atmospheric pressure, contains about 10 times the amount of oxygen necessary to account for rust removed by scrapers from an untreated line.

Should the rate of transfer of oxygen from the product stream to the pipe wall be controlled, a reduction in corrosion might be expected.

The removal of dissolved water from products as a corrosion control method, is accomplished quite readily. This dehydration process[2,3] provides for passing products through towers containing beds of activated alumina, or other desiccant, before entering the pipeline. Removal of dissolved water is continued until the "dew point" of the effluent product reaches a temperature about 5° F. below the lowest temperature encountered in the line.

This process has been used by the authors' company successfully since 1936 with seven such plants in operation currently. As with any procedure there are advantages and disadvantages. Experience with dehydration indicates the following advantages:

1. Complete control of internal corrosion can be obtained.

2. No scrapers or scraper traps are required if means are provided for exclusion of foreign matter.

3. Products are delivered dry with no troublesome emulsions or water clouds.

4. Danger of ice plugs forming in lines in cold regions is avoided.

5. In many circumstances the economics are comparable to inhibition insofar as operating costs are concerned.

Some disadvantages of dehydration are:

1. Capital investment is high.

2. The process is not readily adaptable to operations which require either (a) removal of products from the line for storage and subsequent reshipment by pipeline, or (b) when products are received for shipment at numerous points along a pipeline system.

3. Benefits derived from dehydration are limited to the pipeline and are not extended to tankers, terminal tanks, or subsequent distribution facilities.

4. Certain addition agents that are used to improve product performance in consumer equipment may be removed by the desiccant or materially shorten its useful life.

Inhibitors . . . Isolation of the clean steel pipe surface from the water and oxygen in the product stream constitutes a third method for controlling internal corrosion of pipe lines. Inhibitors accomplish this purpose by creating an effective barrier between the pipe steel and attacking corrosive agents.

The inhibition mechanism[4] for commonly used inorganic, water-soluble, inhibitors has been shown to be the formation of nonpermeable membranes or films of oxides or mixtures of oxides. The action of product-soluble organic inhibitors is usually attributed to the adsorption of the polar group of the molecule on the steel surface, thus forming a dense layer which serves as a corrosion barrier.

The value of water-soluble inhibitors, specifically alkaline solutions of sodium nitrite or chromate,[4] is well attested by their past wide acceptance in the products-pipeline industry. However, they have numerous disadvantages which are not shared by product-soluble inhibitors. Such disadvantages include the following:

1. A substantial quantity of water is injected into the line as a vehicle for the inhibitor. This water, added to the water precipitated from saturated products at the lower soil temperatures, often produces milky or cloudy fuels unless removed by scrapers ahead of fuel oil batches.

"First requirement is to prevent rusting of iron or steel under field conditions. And it should not affect specification properties of products."

2. Addition of water to the line increases the hazard of ice plugs in cold regions.

3. Corrosion inhibition is limited to the pipeline and no protection is afforded facilities before or after the line.

4. Usual practice provides for the separation of the inhibitor solution by hay tanks or other means at terminals and storage tank farms. Reinhibition is necessary if the line is long or if the product is again shipped by pipeline. This increases inhibitor costs and the investment in injection equipment.

5. Injection of water soluble inhibitors must be supplemented by a scraper schedule which serves to distribute the inhibitor on the pipe walls and to remove excess water and residual rust and scale, especially in mountainous regions. A substantial investment in scraper traps and scrapers is, therefore, necessary.

Our company's experience since 1949 has indicated that essentially all of the disadvantages listed for inorganic inhibitors may be avoided by the use of a suitable oil-soluble inhibitor.

Of particular interest are the company-wide economies that can accrue as a result of the versatility of oil-soluble inhibitors in mitigating the rusting of steel. A typical example is gasoline refined in Gulf Coast plants and shipped by tanker to the Atlantic seaboard for distribution by pipeline.

A single treatment with inhibitor at the refinery affords corrosion protection to a variety of structures. These include refinery storage tanks and loading lines, ships cargo tanks and discharge lines, pipeline storage tanks, the pipeline and its often-times-idle branches and spurs, terminal tankage and lines, tank trucks, filling-station tanks and, finally, the tanks of customers.

Inhibition is not complete when turbulence is limited as in terminal tanks, idle lines, and in ships' tanks but experience indicates that a good degree of protection is obtainable even under such conditions.

Requirements of Oil-Soluble Inhibitors

It is rather obvious that the first requirement of an oil-soluble antirust agent is that it effectively prevents the rusting of iron and steel under field conditions. Too, the antirust agent should not have a significant effect on specification properties of the products.

All of the sufficiently potent oil-soluble chemical compounds known to the authors to be economically attractive, are also either chemically active or high in molecular weight, relative to light distillate products such as gasoline, kerosine, and furnace oil. Accordingly, the following requirements, both specification and otherwise, should be evaluated with normal concentrations of additive:

1. The additive should not adversely affect existent gum or induction period tests on gasoline. The additive also should not adversely affect gum buildup in long-term normal-temperature storage tests.

2. It should not affect product color or color stability.

3. It should not reduce octane or cetane ratings.

4. It should not adversely affect kerosine-lamp burning quality.

5. It should not increase carbon residue of kerosine and furnace oil.

6. It should be ash free.

7. It should not promote emulsions or water haze.

8. It should be so constituted as not to cause deposits in engine carburetors, manifolds, combustion chambers, or crankcases.

9. It should not be corrosive to other metals commonly found in consumer equipment. Such metals include brass, copper, cadmium, white metal, and zinc.

10. It should be compatible with other addition agents commonly used such as antioxidants, metal deactivators, tetraethyl lead, etc.

11. It should be relatively nontoxic in concentrated form and completely nontoxic in normal concentrations.

The foregoing is perhaps a formidable list of requirements. However, any relatively new material that goes to the consumer with the product, should receive considerable laboratory or field testing in automotive and heating equipment before use in a pipeline.

After conducting such tests, the authors' company selected one material for pipeline trial. The antirust agent used during the field experiences was Santolene C.[5]

During the test work it was found that one precaution in its use was required, namely, that the additive should be introduced after all caustic treating solution has been removed. This same precaution must also be observed with several widely used gasoline gum stabilizers and was not considered to be a serious disadvantage.

Oil-Soluble Antirust Agent . . .

Field Experiences

Pipeline A . . . This 7-mile 8 and 6-in. products line, pumping 1,000 bbl. per hour of gasoline, kerosine, diesel fuel, and furnace oil into a metropolitan area, was selected for the first trial of the inhibitor.

This particular line had been in use for 7 years, protected by dehydration and never scraped. Since there had been no corrosion difficulties of any kind previously, the purpose of the test was to learn if there were any unforeseen detrimental effects of the additive, either in the pipeline or in consumer equipment.

Inhibitor injection initially was at a concentration of 20 p.p.m. However, corrosion coupons indicated that some rusting was occurring and the concentration was gradually increased to 40 p.p.m. at which point rusting stopped. In view of later experiences this latter concentration is fairly high and, in light of present knowledge is now attributed to the fact that this line operated only 40 hours per week. Under static conditions, where water droplets have the opportunity to stand in one spot and eventually penetrate the protective film on the pipe wall, inhibition is more difficult.

This line hase been well protected by the additive for the last 5 years. Rust content of products leaving the line remained at about the 5-mg. per liter level, which was similar to previous history.

At the conclusion of the initial test period on Pipeline A, no difficulties of any kind, either on the line or with consumer equipment, had been encountered. The oil-soluble inhibitor was therefore considered for larger systems.

Pipeline B . . . The physical layout of this line is given in Fig. 1 which shows terminals and stations pertinent to this discussion. Operation is continuous except for repairs, handling 1,200 bbl. per hour of gasolines, kerosine, diesel fuel, and furnace oil.

Product enters the system from refineries R-1 and R-2 with dehydration employed at both points of entry. However, after 3 years of operation, because of increased pumping rates from R-1, which exceeded dehydration capacity and other operating difficulties, the rust content of products in the T-1 to T-4 leg reached 30 mg. per liter (Fig. 2). This amount of contamination often is sufficient to cause serious consumer complaints. The line was not equipped with scraper traps and consequently had never been scraped.

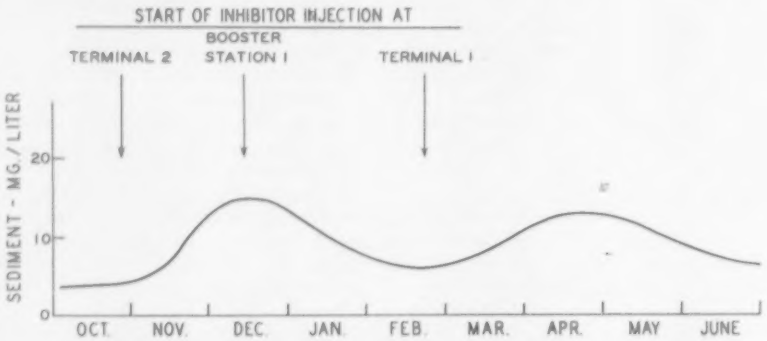


Fig. 3—Average suspended sediment at terminals 2, 3, and 4, after scraping, Pipeline B.

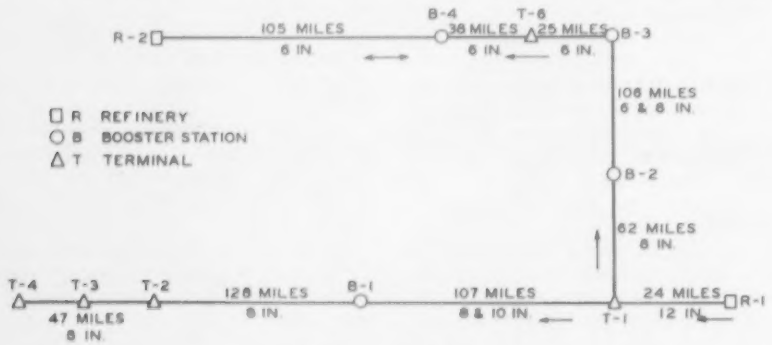


Fig. 1—Diagram of Pipeline B.

Fig. 2—Average suspended sediment at terminals 2, 3, and 4, before scraping, Pipeline B.

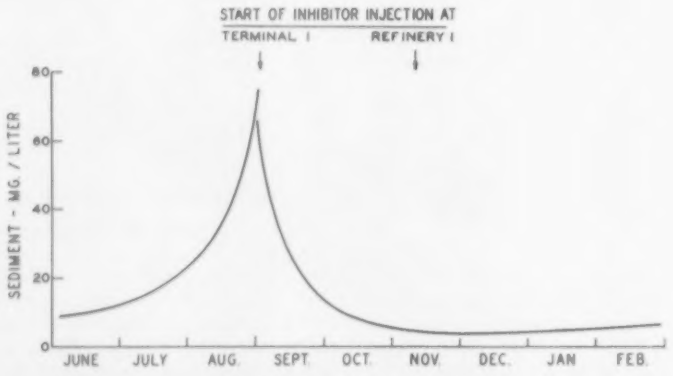


Fig. 4—Average suspended sediment at booster stations 2 and 3, Pipeline B.

Inhibitor was then introduced at R-1 in a concentration of 40 p.p.m. The inhibitor arrived at T-4 about 30,000 bbl. behind the calculated time of arrival. Since this section is about 300 miles long, it is apparent that it required 100 bbl. of inhibited product to saturate a mile of this 12, 10, and 8-in. line.

Within 6 weeks, the rust content of product had increased to 100 mg. per liter and inhibitor injection was stopped in order to ascertain the cause.

Laboratory work has previously shown that the inhibitor would not alter the tendency for products to suspend rust. However, since the inhibitor has an attraction for metal, it was conceivable that it could get underneath the rust layer and lift it from the pipe wall. Other possible explanations for the high rust content included the fact that road-building programs necessitated relocation of portions of the line during this period, which disturbance could have dislodged large quantities of rust.

In addition, it will also be noted from Fig. 2 that the curve showing the increase in rust content during the period of inhibitor injection is essentially an extension of the curve representing the preinhibitor sediment contents.

In any event, the T-1 to T-4 section was equipped with temporary traps and scraped. Corrosion had been quite extensive, as judged by the quantity of rust removed. Additionally, several hundred feet of pipe was plugged ahead of the scrapers.

After the scraping program was completed, the inhibitor was reintroduced at T-2, 47 miles from the end of the line. As shown in Fig. 3, rust contents increased from 5 mg. per liter to 15 mg. per liter and leveled off. When it was evident that no serious rust lifting was going to occur, the point of injection was successively moved to B-1 and then to T-1. The rust contents eventually went down to and stayed at the 5-mg. per liter level as shown in Fig. 3.

To check on rusting conditions, corrosion coupons made of ½ in. round S.A.E. 1020 steel rods were inserted in the top of the pipe and extending to within ¼ in. of the bottom. Before inhibitor injection, all coupon locations showed moderate to heavy rusting within 5 weeks time. After inhibitor injection, coupons were in the bright as-installed condition after 15 months, with a few pin points of rust after 24 months exposure to inhibited product.

During the foregoing period, the T-1 to B-4 section had caused no difficulties and shown no evidence of corrosion. However, as shown in Fig. 4, corrosion did start and the rust content of products increased rapidly to about 75 mg. per liter.

Because of the rapid deterioration of product quality, time was not taken to install temporary traps for scraping or to inhibit the line by sections as was done on the T-1 to T-4 section. The additive was therefore introduced without delay at T-1.

It is evident from Fig. 4, that the rust content of products started to decrease almost immediately and within 2 months was at the 5-mg. per liter level where it has stayed for about 28 months. No rust lifting was noted at any time.

Pipeline C . . . The diagrammatic sketch for this line is shown in Fig. 5.

For 10 years this line pumped gasoline and kerosine from T-1 to T-2 without use of dehydration or inhibitors and with no evidence of rusting other than a small strip of very light rust about 2 in. wide on the bottom of the pipe.

However, a new refinery (R-1) was connected to the line with product being pumped in both directions, mostly to T-2. Within a year, the line C factor dropped from the previous level of 157 to 125 with a corresponding loss in capacity.

Inspection of the line showed that corrosion was most extensive in the leg connecting the refinery with the main line and next most prevalent in the section between the junction and T-2. Corrosion coupons showed that metal losses ranged from 0.7 to 16 mils per year. This higher corrosion rate corresponded to a pipe half life of about 7 years, indicating that the line itself was in serious jeopardy.

Investigations did not show that unusual quantities of water were entering the line from the refinery. However, further laboratory work did show that this product was abnormally corrosive.

It was not possible to isolate the corrosive constituents, nor was it possible to improve the product by any of the conventional treating processes.

Since the corrosion was worst close to the refinery, inhibitor was added at this point in a concentration of 5 p.p.m. Meanwhile, the line was being scraped as frequently as possible, with many tons of rust being removed. Product contamination was high with several hours of rust cloud ahead of every scraper run.

Because of the large quantities of rust cut loose by scrapers, onto which the inhibitor was absorbed, it was several months before full dosages showed up at T-1 and T-2. In spite of this, the additive was effective at the points needed most and corrosion coupon losses soon dropped to the range of .04 to .08 mil per year.

Corrosion rates at the present time, with pumping rate of 3,900 bbl. per day, are in the range of 0.1 to 03 mil per year. Scraper runs have been reduced to one per month, with no rust cloud ahead. Inhibitor concentration has also been reduced to 25 p.p.m. which seems to be the minimum permissible for this line. The history of the line C factor, which is now at 164, is given in Fig. 6. Test sections on heads of hay tanks located near the refinery which were burnished bright are still bright after 2 years exposure to inhibited product.

Pipeline D . . . The general arrangement of this system is shown in Fig. 7. The system is 6 years old and has operated under a steadily increasing load factor, ranging from 20 per cent during its first year to over 75 per cent in the past year. The products handled consist of 85 per cent motor and aviation gasoline and 15 per cent distillates. The experiences in the 12-in. line between booster stations B-1 and B-2 will be reviewed first.

After a year's operation with frequent scraping to remove original rust and scale, the frequency was reduced and the injection of 0.4 lb. of sodium chromate in water solution per 1,000 bbl. of product was started. This procedure maintained the C factor at a high level and kept the sediment fairly low.

Four years' operation under these conditions was generally satisfactory except that fine rust was observed in the deliveries from the two branches beyond booster station B-2. Since other test programs had shown that the oil-soluble inhibitor was more effective and convenient than chromate, it was introduced at booster station B-1. This was accompanied by more frequent scraping and higher sediment levels for a year.

At the end of this year, however, the sediment had dropped from the previous year's high level of 9 mg. per liter

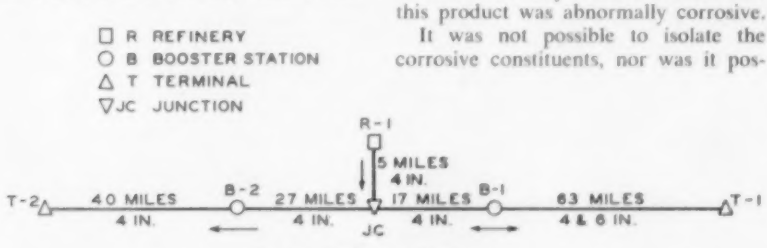


Fig. 5—Diagram of Pipeline C.

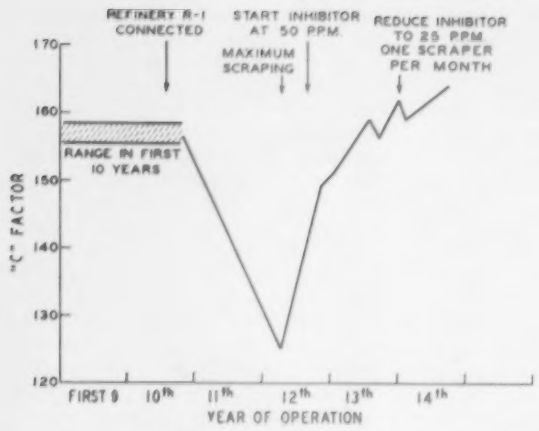


Fig. 6—"C" factor, Pipeline C.

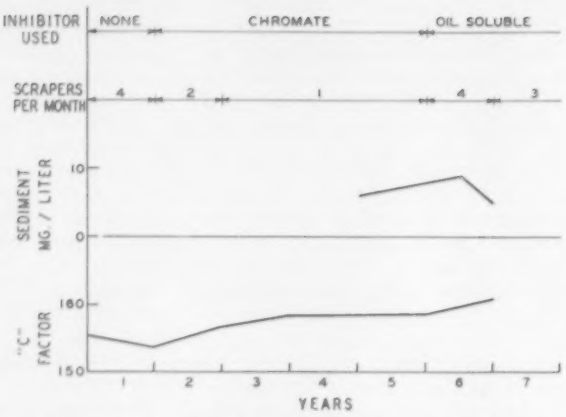


Fig. 8—Operating conditions in Pipeline D, Section B-1 to B-2.

to 5 mg. per liter, its lowest measured value. Also the year's intensive scraping while using the oil-soluble inhibitor effected an increase in C factor from 158 to 161. This is in contrast to a loss of 2 points during the first year's scraping without inhibitor and the relatively unchanged C factor during 3 years' use of chromate. These data are presented graphically in Fig. 8.

The experience on the two branch lines B-2 to T-1 and B-2 to T-3 may be reviewed as follows: During the first 2 years of operation on oil-soluble inhibitor A was injected at five points. During this time, the C factor dropped from 160 to as low as 136 despite frequent scraping.

After the unsatisfactory trial of inhibitor A, another oil-insoluble material, inhibitor B was tried with injections at four points. There was a slow improvement with difficulties persisting during the first few months. This inhibitor was not detected at the end of the line for approximately 6 months.

The C factor increased from a low of 136 to a high of 160 during the use of inhibitor B. After the line was coated, rouge was never a problem. Despite the improvement effected through use of inhibitor B, it was discontinued after 8 months, for reasons of economics and convenience, in favor of a trial of the oil-soluble inhibitor.

This inhibitor is used in a concentration of 11 p.p.m. and is now injected at only one location, booster station B-1. With only infrequent scraping the C factor has increased to 160-165 for various sections of B-2 to T-1 and B-2 to T-3. Sediment is no problem. Inspection of the line shows that polished test areas 300 miles from the point of injection have remained bright and unrusted.

Extension to Tankers

The excellent rust prevention obtained in product pipelines with this oil-soluble inhibitor naturally suggested that other applications be investigated. One of the most costly manifestations of rusting in the petroleum industry is that occurring in the cargo space of sea-going tankers carrying light products. It has been estimated[6] that costs from this cause alone are in the neighborhood of $75,000 per vessel per year.

This type of corrosion is very difficult to control, since at various times the cargo compartments will be exposed to product, salt-water ballast, hot salt wash water, and the atmosphere.

It has already been reported[7] that 45 p.p.m. oil-soluble inhibitor in the cargo is sufficient to reduce this corrosion by 50 per cent. The authors' company has conducted similar tests for over 18 months in three coastwise tankers using 40 p.p.m. of the same antirust agent, Santolene C.

The results obtained confirm those previously reported, in that corrosion was reduced about 59 per cent.

Since the cargo discharged is still fully rustproofed, it therefore follows that a company operating tankers and pipelines can protect both of these valuable types of distribution facilities with one application of oil-soluble inhibitor.

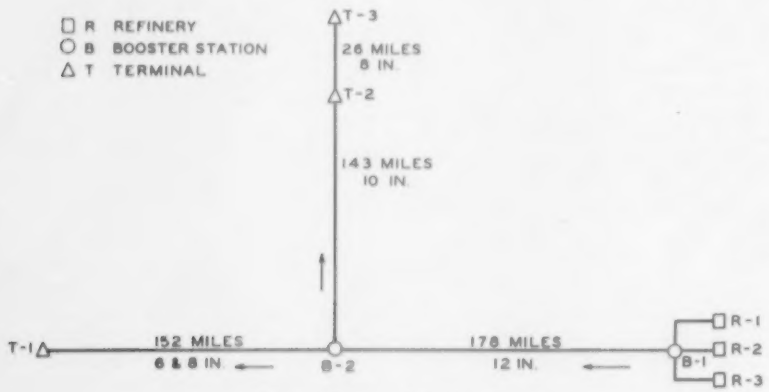


Fig. 7—Diagram of Pipeline D.

Acknowledgment

The experiences reported here are partly those of others rather than the authors. We are especially indebted to J. T. Dickens, of Magnolia Petroleum Co., and to J. J. Harris, of Magnolia Pipeline Co., for many of the data presented.

References

1. J. M. Pearson, "Combating Internal Corrosion," Proc. A.P.I. 24 (IV) 67 (1943).
2. H. K. Phipps, "Use of Dehydration in Combating Internal Corrosion in Products Pipe Lines," The Oil and Gas Journal, 45 (29), 67 (1946).
3. R. P. Dougherty, "How Dehydrators Fight Internal Pipe Corrosion," World Oil, p. 248, April (1953).
4. Ivy M. Parker, "Use of Corrosion Inhibitors in Products Pipe Lines," The Oil and Gas Journal, 45 (28) 255 (1946).
5. Monsanto Chemical Co., Tech. Bull. O-62.
6. W. B. Jupp, "The Nature of Corrosion and its Control," Society of Naval Architects and Marine Engineers, November 13, 1952.
7. J. V. C. Malcolmson, W. S. Quimby, G. D. Pingrey, and J. C. D. Oosterhout, "Inhibitors in Cargo." Society of Naval Architects and Marine Engineers, November 13, 1952.

SILICONES—New Tools for Petroleum Operations

. . . New thread compound formulated with silicone materials is effective in high-pressure service

by F. Lawrence Resen
Gulf Coast District Editor

FIELD evaluation of high-pressure, silicone-containing thread compound on tubing, casing and subsurface controls has indicated satisfactory performance of the material.

Survey results compiled by the production division of American Petroleum Institute indicated highly satisfactory field performance of the compound in casing and tubing service, while Otis Pressure Control, Inc., Dallas, reported that the compound considerably reduced leaching and galling which had been experienced on subsurface equipment.

The A.P.I. bulletin, dated May 24, 1954, was based upon a questionnaire of February 11, 1954, sent to purchasers of the high-pressure silicone compound. Replies were received from both oil-company and manufacturer users of the thread compound with the individual company comments and findings summarized as follows:

Favorable Findings

- With tubing, no difficulties were encountered. The compound is readily applicable, and adheres well to threads. No galling of threads was experienced, with the quantity being used the same as for other thread compounds. The compound was satisfactory under the service conditions encountered.
- With casing, no difficulties were encountered in running, and performance was satisfactory.
- Durability of compound may exceed that of others.
- It was found to be an excellent antigall compound and a better sealer than 60 per cent zinc compound. No leakage after more than 2 years in service.
- No joint leakage has developed in service.
- Field tests not completed yet, but all incoming reports indicate compound is a good one.

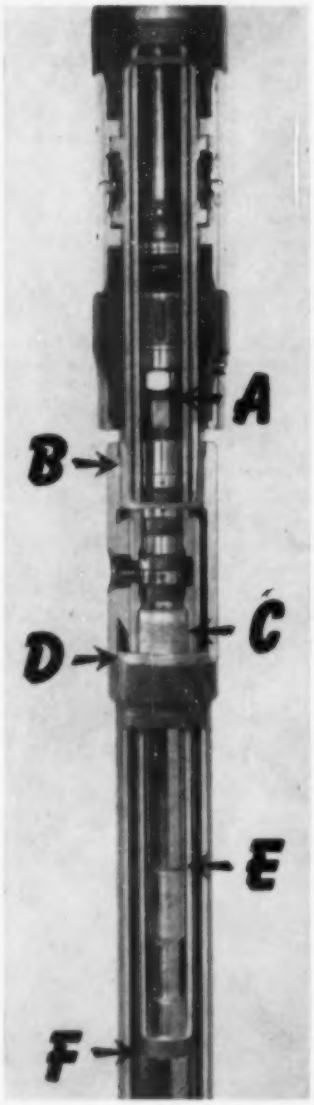


Fig. 1—Otis Pressure Control's two-zone pump. Leaching and galling occurred frequently at points indicated by letters prior to use of A.P.I. high-pressure thread compound containing silicones. (See table 5.)

- No appreciable leakage at 1,000 psi. natural-gas pressure in gathering lines, but service not severe enough to afford real conclusions.

When employed in running used casing, threads made up all the way when coupling with spinning line before tongs were applied. The ease with which this used pipe was made up was impressive because secondhand casing joints normally are difficult to make up.

The lubricating properties of the silicone compound enabled the joints to be made up to such an extent that it enhanced the sealing properties of the joint by providing a metal-to-metal seal in addition to the seal afforded by the thread compound.

- It was used by one operator on seven casing strings and one tubing string with no leaks being encountered.
- It was the opinion of another that the lubricating and sealing qualities of the silicone-thread compound made it superior to any compound that had previously been used.
- No galling of threads was observed in any case by another operator.

Unfavorable Findings

- It was noted by an operator that the metallic constituents settled out when the compound was left standing, and a layer of vehicle oil rose to the top. However, it was reported that the precipitate easily mixed into solution again.
- In tests to 5,000 psi., a name-brand lubricant was indicated to be efficient. However, the durability of the high-pressure silicone compound might exceed that of others, it was reported.
- One operator felt he possibly had one slight leak in a 7-in. oil string in a dually completed well. Pressure exists on the surface string, and the well is producing distillate from both zones.

Summation . . . The A.P.I. bulletin summarizes the findings to the effect

that approximately 2,427 casing joints, 3,722 tubing joints, and an undisclosed number of joints of line pipe were made up with the high-pressure thread lubricant under varying service conditions, and only one of these joints was reported as leaking.

Laboratory and mill tests confirmed the results of field tests, where the test conditions paralleled service conditions up to a maximum of 17,500 psi.

The silicone-containing compound is an outgrowth of a special research project sponsored at the Mellon Institute of Industrial Research, Pittsburgh, by the A.P.I.'s division of production. Purpose of the research was to develop a thread compound which would provide tightness in threaded pipe joints under high pressures when they were made up in accordance with recommended A.P.I. practices.

In its November 1952 bulletin 5A2, the A.P.I. noted that the advent of deeper drilling has resulted in higher service pressures, increased formation temperatures, and heavier casing-and-tubing string loads. Field experience has shown that threaded joints on oil-country tubular goods require a suitable thread compound to be pressure-tight, with most of the common zinc-based compounds not being entirely suitable for deep, high-pressure wells.

It was determined that a satisfactory thread compound should have the following characteristics:

1. Adequate lubricating qualities to prevent galling in threaded connections during makeup.

2. No tendency to disintegrate or undergo radical volume change at temperatures up to 300° F. It must also remain viscous enough to prevent leakage at these same temperatures.

3. It must not show deleterious instability or contain any driers or hardeners that will evaporate or oxidize, thereby changing the thread-compound properties.

4. Resistance to water absorption.

5. Sufficient inert filler to prevent leakage of A.P.I. round-thread casing and tubing joints under pressures as high as 10,000 psi.

6. Readily applicable by brush to pipe joints in cold weather.

The compound which was developed under this project was subjected to field and laboratory tests and shown to possess to a satisfactory degree the characteristics outlined.

TABLE 1—AMOUNT AND TYPE CASING RUN WITH COMPOUND

Pipe description—	Joints	Footage
Used* 9⅝-in., 40 lb., J-55 8 RT (2,300 ft. per well)	555	16,100
New 7-in., 20 lb., J-55 seamless	307	9,500
New 7-in.	620	18,600
New 7-in., 23 and 29 lb., N-80, LTC and new 5½-in., 17 lb., N-80, x-line, mixed	378	10,900
Unidentified size of which 208 joints were shipped from mill with compound as sealer	400	12,000
7-in., 23 lb., J-55, STC†	167	5,000
Total‡	2,427	72,100

*Note **used** casing. †Italian pipe field tested to 3,500 psi. to establish leak resistance of mill-applied connections made up with other-type compound. Twenty-two joints thus tested failed to hold test pressure and were discarded prior to running in well. ‡Approximate.

TABLE 2—AMOUNT AND TYPE TUBING RUN WITH THREAD COMPOUND

Tubing description—	Joints	Footage
2⅞-in., 6.5 lb., J-55 and N-80, 9 per cent Ni. Hydril CS jts.	677	25,600
2⅞-in., N-80	389	12,200
2⅜-in., J-55, EUE, A.P.I. tube-coated	145	4,500
2⅜-in., 4.7 lb., J-55, EUE	439	13,628
2⅜-in., 4.7 lb., N-80, EUE	602	18,700
EUE, 8 RT*	130	4,000
J-55 and N-80 EUE 8 RT	1,340	41,600
Total†	3,722	120,228

*Run twice in well at depth of 6,500-10,500 ft., both times with high-pressure thread compound applied. †Approximate.

Makeup of the thread compound is as follows:

Component—	Per cent by wt.
Aluminum-stearate-base grease	20.46
Silicone compound*	12.85
Silicone fluid†	2.59
Graphite	18.00
Lead powder	30.50
Copper flake	3.30
Zinc dust	12.30

*Dow Corning XC-217. †Dow Corning XF-60.

The aluminum-stearate-base grease is made up of 93.8 per cent process oil and 6.2 per cent stearate, by weight.

In the A.P.I. survey, nine companies returned the questionnaires supplying data obtained under fairly representative conditions encountered in oil fields throughout the United States. The information supplied was not uniform, so it was not always possible to give complete data in the reports. The amount and type of casing and tubing run with the thread compound is given

TABLE 3—TEST PRESSURES AND SERVICE CONDITIONS

Tubing and casing—	Hydrostatic test press., psi. Mill	Hydrostatic test press., psi. Field	Makeup torque, ft.-lb.	Bottom hole Temp., °F.	Bottom hole Pressure, psi.	Depth, ft.	Type production
2⅜-in., J-55, EUE	3,000	*3,000	550-700	210-255	267-495	10,000	Oil†
2⅜-in., N-80, EUE	5,000			190			Gas distillate
2⅞-in., J-55 & N-80		6,500 J-55	2,500	198-218	6,000-7,100		Gas distillate
EUE with Hydril CS jts.		8,500-9,000 N-80					
2⅞-in., N-80						12,200	Gas distillate
EUE 9 per cent Nickel Hydril			820		2,500	2,900-7,900	Gas
CS jts.			1,300		2,500	2,900-9,500	Gas
EUE A.P.I. tubing		2,000	1,700			6,500-10,500	Gas
			2,000			4,500-7,700	
			2,000			7,700	
		9,000	1,500		3,000	4,600-9,200	Gas
		9,000	1,000		5,600	9,000	Gas
		6,000	1,150		3,100	6,100	Gas
		9,000	1,050		5,700	6,000	Gas
2⅜-in., J-55, EUE			2,000			4,500	
7-in., 20 lb., J-55, sml.	3,000	*3,000	3,200-3,600	120-140	250		Oil
7-in.	3,500	‡1,200		190			Gas distillate
7-in., 23 and 29 lb., N-80, LTC and 5½-in., 17 lb., N-80, x-line		‡1,200	5,200	198-218	6,000-7,100		
9⅝-in., 40 lb., J-55 (used)	§2,500					2,300	Oil
No description				200-212	3,400		Gas distillate
7-in., 23-lb., J-55, STC (Italian)		¶3,500			2,200	5,000	Gas-dual completion

*Eleven joints selected at random, after being in storage—tubing 5 months and casing 3½ months. Test pressure maintained for 10 minutes. †Oil being produced through tubing by hydraulic pumps, gas lift, long-stroke pumping, flowing, and one string used for water injection. ‡Pressure applied, after cementing shoe, for 10 minutes and then released. §After cementing. ¶Prior to running in well, field tested to 3,500 psi. to establish leak resistance of mill-applied connection. Twenty-two joints failed to hold test pressure and were discarded.

TABLE 4—SUMMARY OF FIELD USE OF A.P.I. THREAD COMPOUND

Date	Pipe Size	Pipe Grade	Pipe Connection	Thread comp. Field end	Thread comp. Mill end	Interval	Length	Test press.	Makeup torque	Prod.	Max. pressures Flowing	Max. pressures Shutin
2-18-52	2⅜	9% Ni	Hydril CS	5,160		0-2,900	2,900			Gas	3,200	3,300
		N-80	EUE-8R	A.P.I.	A.P.I.	2,900-8,000	5,100		820			
		N-80	EUE-8R	5,160	5,160	8,000-9,200	1,200					
3-31-52	2⅜	9% Ni	Hughes TC	5,160		0-3,000	3,000		1,700	Gas	4,475	
		N-80	Spangseal	5,508		3,000-7,000	4,000		1,700			
		N-80	EUE-8R	A.P.I.	A.P.I.	7,000-10,500	3,500		1,700			
4- 1-52	2⅜	J-55	Spangseal	5,508		0-9,500	9,500			Gas	2,700	2,900
Well head connections			EUE-8R	A.P.I.								
8- 6-52	7-in.	J-55	STC (F)	A.P.I.		0-5,000	5,000	1,000		Gas	1,800	2,200
		N-80	LTC	A.P.I.	5,508	5,000-6,600	1,600	1,000				
11-16-52	2⅜	9% Ni	Hydril CS	5,160		0-2,900	2,900		1,300	Gas	3,185	3,330
		J-55	EUE-8R	A.P.I.		2,900-9,500	6,600		1,300			
11-19-53	2⅜	J-55 TK	EUE-8R	A.P.I.	A.P.I.	0-4,500	4,500	4,000	2,000	Gas		2,800
		J-55	EUE-8R	A.P.I.	A.P.I.	4,500-7,700	3,200	4,000	2,000			
12-15-52	2⅜	9% Ni	Hydril CS	5,160		0-4,600	4,600	9,000	1,500	Gas	5,000	5,600
		N-80	EUE-8R	A.P.I.	5,160	4,600-9,200	4,600	9,000	1,500			
		N-80	Hydril FJ	5,160		9,200-10,300	1,100	9,000	400			
1- 3-53	2⅜	J-55	EUE-8R	A.P.I.	A.P.I.	0-7,700	7,700	5,000	2,000	Gas		2,500
1-13-53	2⅜	J-55	EUE-8R	A.P.I.		0-6,100	6,100	6,000	1,150	Gas	2,560	3,100
		J-55	EUE-8R	5,160		6,100-9,300	3,200	6,000				
3-28-53	2⅜	N-80	EUE-8R	A.P.I.	A.P.I.	0-9,000	9,000	9,000	1,000	Gas	5,000	5,600
		N-80	Hydril FJ	5,160		9,000-10,300	1,300	9,000	400			
4-18-53	2⅜	N-80	EUE-8R	A.P.I.	A.P.I.	0-6,000	6,000	9,000	1,050	Gas	5,400	5,700
			EUE-8R	5,160	5,160	6,000-9,600	3,600	9,000	1,050			
			Hydril FJ	5,160		9,600-10,700	1,100	9,000	400			

in Tables 1 and 2 respectively. The test pressures and service conditions are shown in Table 3.

Test reports . . . Laboratory tests were made under severe conditions of varying temperatures and pressures with water and nitrogen gas as testing mediums. Hydrostatic test pressures to a minimum of 17,500 psi., and nitrogen-gas pressures to a maximum of 15,000 psi. were employed along with varying temperatures of atmospheric to 175° F. With A.P.I. round thread and integral connections with o.d. of female member 5/32-in. + smaller than A.P.I. coupling o.d., no leakage was experienced in the hydrostatic tests. More than 50 per cent of specimens leaked nitrogen gas before completion of 100 temperature-pressure cycles.

Tests made by another company consisted of connecting a number of 2⅜-in., N-80, EUE, 8 RT tubing pup joints together with tubing couplings, and lubricating one end with the high-pressure compound and the other with a 65 per cent zinc-thread compound. When tested hydrostatically, at pressures not given, it was indicated that the silicone compound possessed somewhat superior lubricating properties together with definitely superior sealing qualities.

An initial gas-retention test was made by sealing A.P.I.-8-RT well-head connections with the high-pressure compound. The compound successfully sealed against 5,800 psi. static gas pressure for approximately 10 min.

Detailed report . . . One major company's field evaluation of the thread company is of interest because it shows the details on individual wells, information not included as such in the A.P.I. bulletin. In this evaluation, reports were first made on surface tests, with down-the-hole tests following (Table 4).

Surface tests . . . The first test involved connecting a number of 2⅜-in., N-80 EUE-8R thread tubing pup joints together with tubing couplings, while lubricating one end of the connection with silicone thread compound and the other with a No. 5506 (65 per cent zinc) compound. The results of these tests indicated the silicone-bearing compound possesses somewhat superior lubricating properties together with definitely superior sealing properties.

Due to the fact that the above-described surface tests were conducted with water as the hydraulic-pressure medium, an initial test of the gas-retention abilities of the material was performed by sealing selected A.P.I.-8R thread well-head connections with this compound. The compound successfully sealed against 5,800-psi. static pressure for approximately 10 minutes.

It was concluded from the data obtained from the above-described test that this material warranted down-the-hole testing. Therefore, when sufficient quantities became available to permit actual well tests, a series of tests was conducted in selected wells to meet particular conditions. In general, it was decided to begin with dry-gas wells in the pressure range of 3,000 to 4,000 psi. Higher pressures were tested only after satisfactory performance had been observed in this initial range of pressures.

Down-the-hole . . . Pressures on the down-the-hole tests were gradually increased until the compound was used to seal A.P.I.-EUE-8R thread tubing against 5,700 psi. shutin tubing-gas pressure.

To permit proper evaluation, the various tests are described briefly in chronological order with the company report referred to dated April 1954:

Well A—February 18, 1952: The silicone thread compound was used to seal 5,000 ft. of EUE-8R thread tubing below 2,900 ft. of 9 per cent nickel-Hydril-CS joint tubing. The T and C section contained a maximum pressure of approximately 2,500-psi. gas pressure. This string was run once using 820 ft.-lb. torque in this interval, and

TABLE 5—COMPARISON CHART

	Type thread—	Number required per pump	Per cent malfunctions encountered: Prior to silicone compound use (approx.)	Per cent malfunctions encountered: Subsequent to silicone compound use
A	Heat treated 14 thd.	2	2.0	0.04
B	Special pipe, 11½ thd.	1	14.0	0.00
C	Straight, 12 thd.	1	1.5	0.00
D	Special pipe, 11½ thd.	1	7.0	0.08
E	Straight, 14 thd.	1	2.0	0.00
F	Straight A.P.I., "F-1" thd.	(*)	1.5	0.00

*This thread is variable; numerous small threads for balls and seats. The number, of course, will vary with the type and length of pump installed. Percentage figure here is based on galled threads encountered in service work in the field.

no evidence of leakage has been observed.

Well B—March 31, 1952: The compound was used to seal 4,000 ft. of EUE-8R tubing in the interval from 6,500 to 10,500 ft. during a drill-stem test. This string of tubing was run twice using power-tubing tongs with 1,700 ft.-lb. applied torque. The maximum pressure applied to this interval was approximately 2,000 psi. and no evidence of leakage was observed.

Well C—April 1, 1952: The compound was used on the landing nipples, side-door choke nipple, and other well-head connections having 8R threads when this well was completed. The maximum pressure retained was approximately 2,900 psi. The Spangseal tubing was lubricated with graphite thread compound and the makeup torque was not recorded.

Well D—August 6, 1952: The compound was used to seal 5,000 ft. of 7-in., 23-lb., J-55, STC Italian casing for a well planned for dual completion. After completion, maximum casing pressure recorded was 2,200-psi. gas pressure. This pipe was previously tested to 3,500 psi. to establish the leak resistance of the mill-applied connection. Twenty-two joints failed to hold the test pressure and were discarded. After running casing, no leakage was observed.

Well E—November 16, 1952: The A compound was used to seal 6,600 ft. of EUE-8R tubing below 2,900 ft. of 9 per cent nickel tubing with Hydril CS joints. The A.P.I. connections contained gas pressure of approximately 2,500 psi. after having been made up with 1,300 ft.-lb. torque. No evidence of leakage had been observed when report was compiled.

Well F—November 19, 1952: On the initial completion of this well, the compound was used to seal the entire string which consisted of 4,500 ft. of tube-coated and 3,200 ft. of black 2⅜-in. J-55 EUE A.P.I. tubing. The string was run without incident using a make-up torque of 2,200 ft.-lb. in the well as brought in.

Approximately a week later, as a result of bushing failure, full well-head pressure appeared on the casing of this well. During the subsequent workover operations, the above tubing string was replaced with 7,700-ft. string of black tubing lubricated with compound. Again 2,000 ft.-lb. of torque was used in making up, with no evidence of leakage observed when report was compiled.

Well G—December 15, 1952: During the initial completion of this well, subsequent to a blowout, the compound was used to lubricate 4,600 ft. of A.P.I. EUE tubing below 4,600 ft. of 9 per cent nickel Hydril CS jointed tubing. The joints were made up with 1,500 ft.-lb. torque and Loomis tested to 9,000 psi. These connections were exposed to a pressure of approximately 3,000 psi.

Although no leakage was observed, it was decided to remove the 9 per cent nickel tubing and the well was worked over March 28. During the workover operations, a full 9,000-ft. string of A.P.I. EUE tubing was run lubricated with the compound. A makeup torque of 1,000 ft.-lb. was used, and this string was Loomis tested to 9,000 psi. This tubing string retained 5,600 psi. gas pressure and no leakage had been observed to the date the report was compiled.

Well H—January 13, 1953: The compound was used on 6,100 ft. of EUE-8R tubing during the initial completion of the well. The joints were made up using 1,150 ft.-lb. torque and were Loomis tested to 6,000 psi. This tubing string has retained 3,100-psi. shutin gas pressure with no observed leakage to date of report.

Well I—April 18, 1953: The compound was used to seal the top 6,000 ft. of A.P.I. EUE tubing in this well. This tubing string was placed using 1,050 ft.-lb. makeup torque and was Loomis tested to 9,000 psi. The string has successfully retained 5,700-psi. gas pressure to date of report.

Subsurface equipment . . . Otis Pressure Control is primarily engaged in selling and servicing subsurface flow controls employed in the production of crude oil, gas and gas distillate. These controls are usually installed and serviced after the tubing is landed and the well brought in and/or placed in a producing condition. The very nature of this work dictates the use of small-diameter screw threads, high pressure metal-to-metal seals, and corrosion-resistant materials.

Otis agreed to participate to a limited extent with the special project sponsored by the A.P.I. division of production in the form of using some 3 gal. of the specially prepared silicone compound which was manufactured by Gulf Research Corp.

Among the items installed and serviced by Otis is the two-zone pump, and prior to the use of the silicone thread compound, considerable leaching occurred in the threaded joints when it was placed in the well. It was felt that the drying out of the thread compound while in the well bore was the cause of numerous galled threads occurring at the time of breakout during equipment service periods. Galling of threaded joints at the time of make-up had also been experienced. The regular and special shop manufacturing processes were changed and altered, and an improvement was felt to have been made in this thread condition.

Shortly after April 1952, the use of silicone thread compound was begun. Approximately 123 two-zone pumps later, and 1 year, 7 months of field service later, only two thread-sealing and galling malfunctions have been experienced.

In Fig. 1 is a photograph of a cut-away model of the annular packer and cross-over assembly, showing upper-zone standing-valve assembly, packoff, and holddown in place in their normal operating positions. Letters correspond to those in Table 5 for the critical threaded connections.

It may be seen from the table that the percentage of malfunctions declined from a maximum of 14 per cent to a maximum of 0.08 per cent after the silicone compound had been used.

There's No Water Pollution Here

Imperial's Sarnia refinery collects detrimental material, removes contaminants, sells residue

by A. D. McRae

A PROGRAM of good housekeeping at the Sarnia refinery of Imperial Oil, Ltd., is the prime requisite for the collection of detrimental material which would otherwise impair the water quality of the St. Clair River, international boundary on which the refinery is located. Purity of the river water is controlled by the International Joint Commission. Objective of this body is to maintain water of high quality for domestic and industrial use.

Contaminants are removed at source wherever possible, and the use of biological oxidation is employed for the removal of residual phenolic materials and other reducing compounds.

Spent caustic soda and sour condensates are neutralized by flue gas and an overhead material burned as fuel. The recovered petroleum acids are either burned or sold to chemical companies as a basis for plastics or organic chemicals.

The solid material collected is dewatered and deoiled by centrifuges, the oil recovered, and the solids burned in a multihearth furnace especially designed for the purpose.

Breaking emulsions . . . Whenever possible lines have been put in trenches, or elevated above the ground, in order to detect leaks quickly. Emulsions have been eliminated at the source, as illustrated by the use of condensate water from vacuum surface condensers as a makeup for crude-desalting purposes. This water contain waxy emulsions and some high-boiling mercaptans which will cause trouble if run to the sewer.

If desalter brines are causing trouble in oil separators, these are held in a settling tank before discharge. Separation of clean cooling water from oil-contaminated water is essential and this has been carried out wherever possible. The clean water flows through a separator with five times the velocity of the oily-water separator.

The circular-type separator has found favor for new construction, the first one being installed at Winnipeg in 1952,

Author is with Imperial Oil, Ltd., Sarnia, Ont. Paper presented at the fourth Chemical and Petroleum Engineering Conference of the Chemical Institute of Canada, Montreal, 1954.

What Canada Is Doing to Regulate Waste Disposal

THE objectives for boundary water control of the International Joint Commission as applied to the petroleum industry, are as follows: "Industrial waste effluents from phenolic hydrocarbon and other chemical plants will cause objectionable tastes or odors in drinking or industrial water supplies and may taint the flesh of fish. Adequate protection should be provided for these waters if the concentration of phenol or phenol equivalents does not exceed an average of 2 parts per billion and a maximum of 5 parts per billion at any point in these waters following initial dilution. This quantity in the receiving waters will probably be attained if plant effluents are limited to 20 parts per billion of phenol or phenol equivalents."

Furthermore, the objectives ask that the pH of the effluent be maintained within the limits of 5.5 and 10.5 and that the non-volatile oil content should not exceed 15 parts per billion.

Technical representatives of Imperial Oil, Ltd., keep in close touch with the International Joint Commission especially in control of pollution in the Sarnia area. This activity is linked with the St. Clair River Research Group, a subcommittee of the advisory group on waste disposal of the Ontario Research Council. A company representative is a member of both of these groups and is chairman of the St. Clair River Research Project.

This latter activity is sponsored by the Ontario Research Council and the costs are divided equally between the Provincial government and Sarnia industry. The first project to be carried out was a comprehensive air-pollution survey of the area, followed by a water pollution survey. Much valuable information has been obtained and the participating companies have materially reduced sources of air pollution and contamination of boundary waters. This activity will be, of necessity, long-ranged in order to keep a close control of effluents and to educate newcomers in the area.

Similar projects are slated for Alberta, and possibly Quebec. This type of research project is unique on this continent and it is believed that it will serve as a pattern for the formation of similar groups in other parts of Canada.

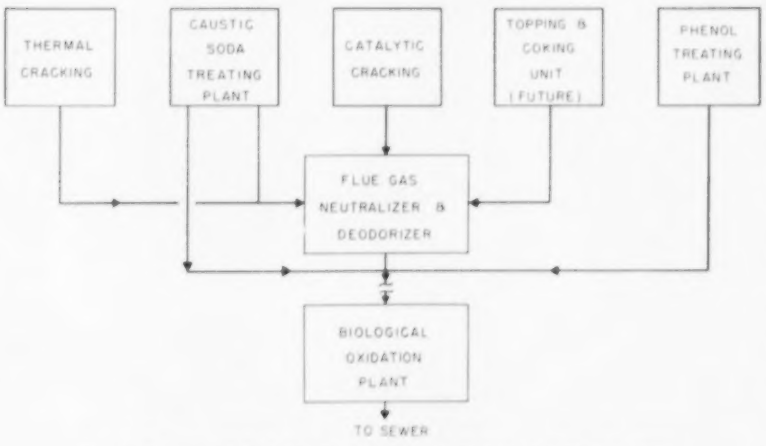


Fig. 1—Sources of feed for Sarnia refinery's biological oxidation plant.

followed by a clean and oily-water pair at Sarnia. At the present time a new circular separator is being built at Montreal. It is felt that the advantages of a circular-type separator outweigh those of a rectangular type due to the simplicity of removing sediment and recoverable oil as compared to multiple flight scrapers in the rectangular type.

To date the circular-type separators have given very good service and the effluent meets the objectives of the International Joint Commission in respect to oil content. Modernization of existing rectangular separators is being carried out following the recommendations of the American Petroleum Institute.

Flue-Gas Neutralization

Details of the flue gas neutralizer are shown in Fig. 2. This unit operates at approximately 5-10 psi., handling materials shown in Fig. 1. The neutralizer employs flue gas from catalytic cracking at a rate of 560 to 1,000 cu. ft. per minute at an approximate temperature of 400°-500° F. The flue gas contains approximately 11 per cent carbon dioxide with lesser quantities of carbon monoxide, oxygen, and SO_2, and is delivered at a pressure of 6 psi.

Requirement of 120-psi. steam, for the tower are between 2,000 and 5,000 lb. per hour. The sour-water feed is approximately 60 g.p.m. with an H_2S content of 0.25 to 0.35 per cent by weight, ammonia 0.30 to 0.35 per cent, phenolic material 500-700 p.p.m. In addition, spent caustic is charged at a lower level in the neutralizer at a rate of between 1.5 and 3 g.p.m. It is necessary to maintain the spent lye below a specific gravity of 1.1 to prevent solidification of the neutralized aqueous portion at the bottom of the tower due to supersaturation by sodium carbonate and sodium thiosulphate.

If necessary, excess air may be added to the tower to complete the oxidation of polysulfides. Acid oils including phenols are separated in a disengaging drum and removed for use as refinery fuel oil or for possible sale to chemical companies. The overhead gases from the neutralizer are burned in an adjacent process furnace. These gases contain liberated hydrogen sulfide, ammonia, and some phenolic material.

The bottoms from the disengaging drum are pumped to the biological oxidation plant. Where spent acid is available in refineries, it is, of course, advantageous to use this as a neutralizing source and the same type of tower is used to strip the neutralized mixture by the use of steam or air.

Biological Oxidation

Some years ago Dow Chemical Co., found in pilot-plant studies at Midland,

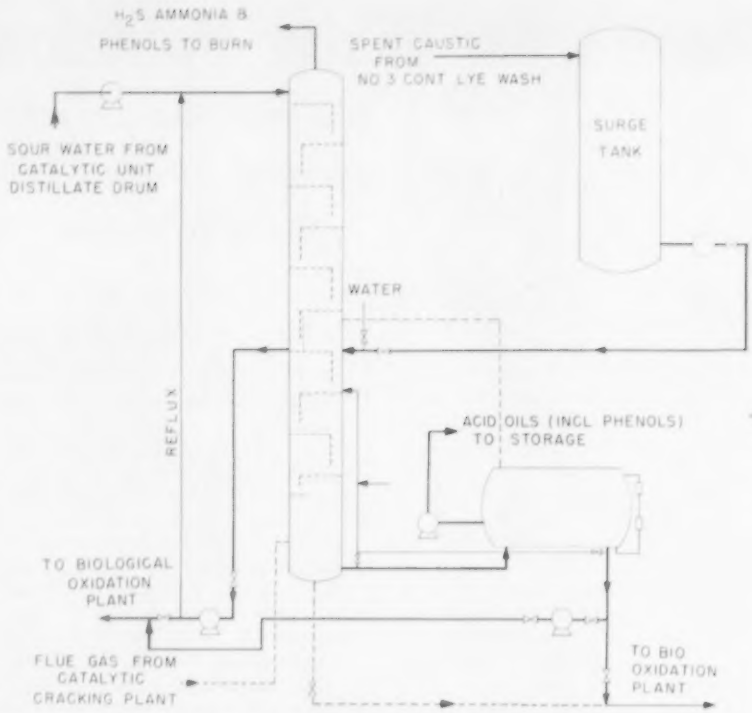

H_2S AMMONIA & PHENOLS TO BURN
SPENT CAUSTIC FROM NO 3 CONT LYE WASH
SURGE TANK
SOUR WATER FROM CATALYTIC UNIT DISTILLATE DRUM
WATER
REFLUX
ACID OILS (INCL PHENOLS) TO STORAGE
TO BIOLOGICAL OXIDATION PLANT
FLUE GAS FROM CATALYTIC CRACKING PLANT
TO BIO OXIDATION PLANT

Fig. 2—How flue gas is neutralized at Sarnia refinery.

Mich., that living organisms, such as rod-shaped bacteria which multiply by fission, were capable of consuming phenolic wastes in the proper environment. Oxygen required for complete oxidation of 1 lb. of phenol to carbon dioxide and water amounts to 2.38 lb.

The cost of biological oxidation is approximately 6 cents per pound of phenol destroyed as compared to 40 cents for ozone, 70 cents for chlorine, and approximately $2 for chlorine dioxide. The bacteria, in order to grow actively, must have a water medium and a source of carbon, oxygen, and nitrogen, since the cell is protein. Rapid growth under proper conditions creates a slime which, in the case of a trickling filter, coats the surface of the media, or in the case of activated sludge is a clump or floc. A single cell in contact with water, containing an organic compound, oxygen, and nitrogen, exude an enzyme which chemically breaks down the feed source to simpler, usable compounds.

The carbon and nitrogen are made into protein protoplasm and the cell divides. The excreted products are CO_2, NO_3, and H_2O. The geometric

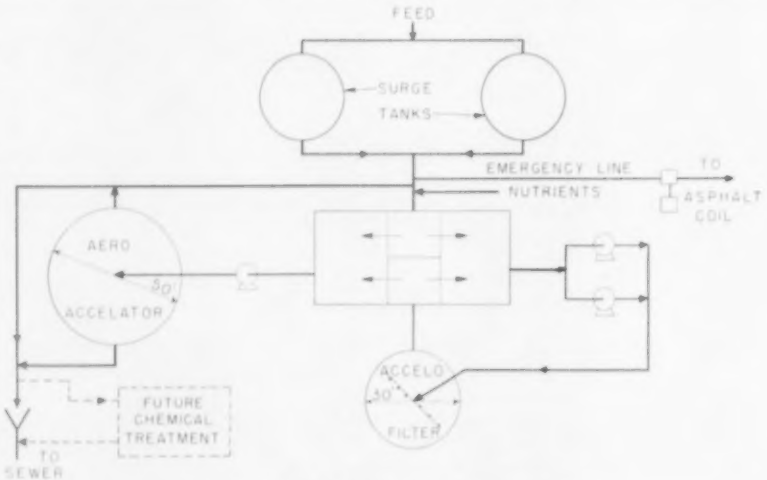


Fig. 3—Flow at biological oxidation plant.

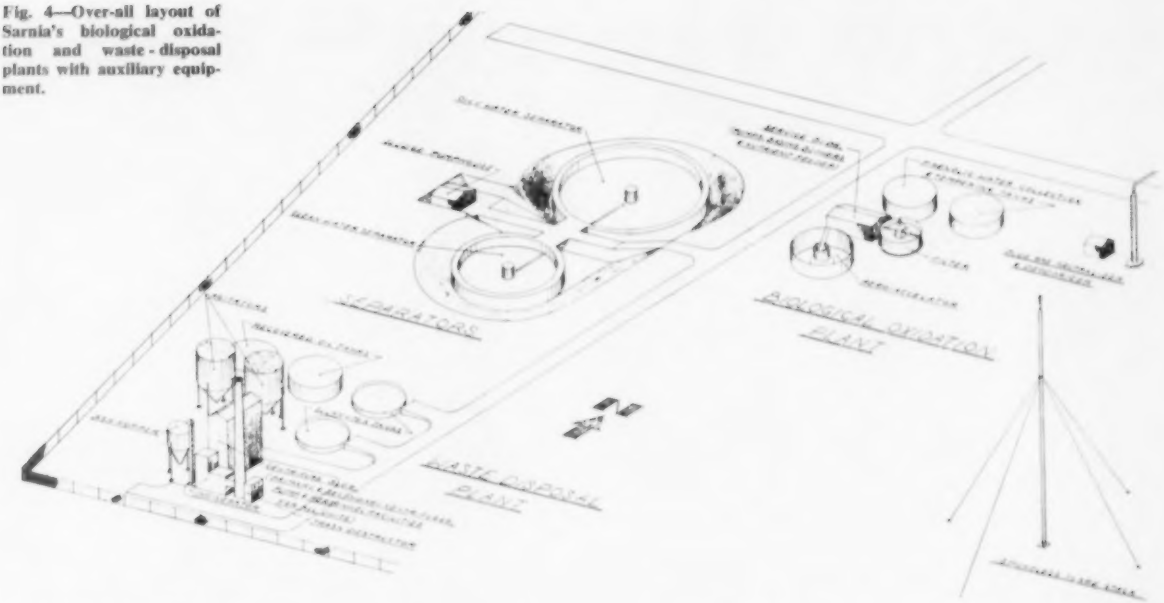


Fig. 4—Over-all layout of Sarnia's biological oxidation and waste-disposal plants with auxiliary equipment.

progression persists as long as excess carbon with available oxygen and nitrogen exists. The temperature affects the metabolism of the bacteria and it is essential to maintain the system at approximately 80° F. Adequate cultures of the required bacteria can be obtained from raw river water or cultivated soil. It is essential, however, that suitable nutrients be added if ammonia, phosphates, and nitrates are not present in the feed to the biological system.

Ten per cent of the feed is through the trickling filter (Fig. 3 and 5), where a 7 to 1 recirculation rate is maintained. Recirculation of the Aeroaccelator is also provided and a total residence time of 4 hours is required for oxidation. Some 500,000 gal. per day of phenolic material is oxidized in this plant to maintain water quality in the St. Clair River.

Waste-disposal plant . . . This plant (Fig. 8) is designed to handle approximately 900 bbl. per day of tank bottoms, oil-separator bottoms, and emulsions from separators and slop tanks. Two 3,000-bbl. cone-bottom tanks collect pumpable waste material composed of free oil, water-in-oil emulsions, silt, fine carbon, plus approximately 80 per cent water. Material that cannot be pumped is brought in trucks to slurry mixing tanks at ground level and mixed by steam and water or feed directly to a primary centrifuge of the horizontal type, which removes 95 per cent of the solids containing 19 per cent oil and 15 to 40 per cent water.

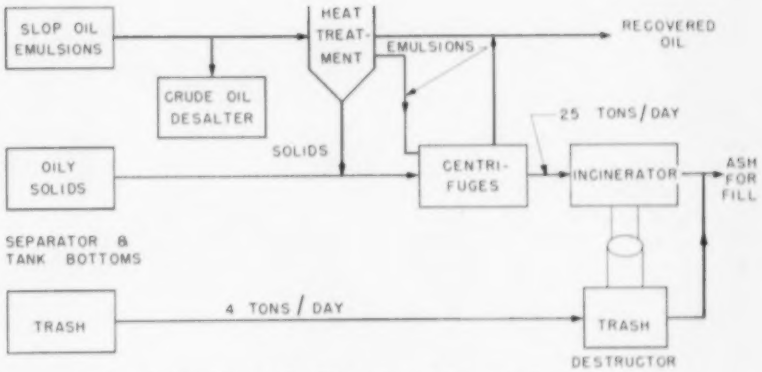


Fig. 6—Emulsions and solids section of the waste-disposal system.

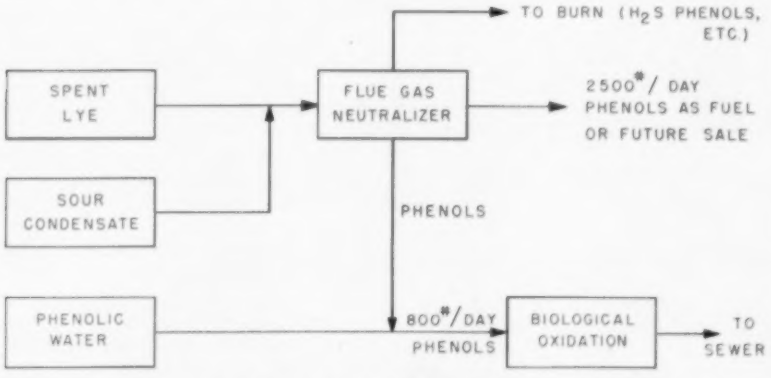


Fig. 5—Phenolic water-disposal flow chart.

The secondary centrifuge receives the filtrate from the primary and removes the remaining finely divided material for subsequent disposal. The oil in water from the secondary centrifuge flows to a settling tank where rapid separation occurs. The recovered oil is suitable for inclusion into the crude-processing units as the water content has been reduced below 0.5 per cent.

The value of the oil recovered by this process will more than pay for the installation of the centrifuges in a year's time. Furthermore, the principle of dewatering and deoiling sludge before incineration is one that should be kept in mind by anyone planning the economical disposal of refinery waste material. It is evident that a much larger incinerator would be required if the orig-

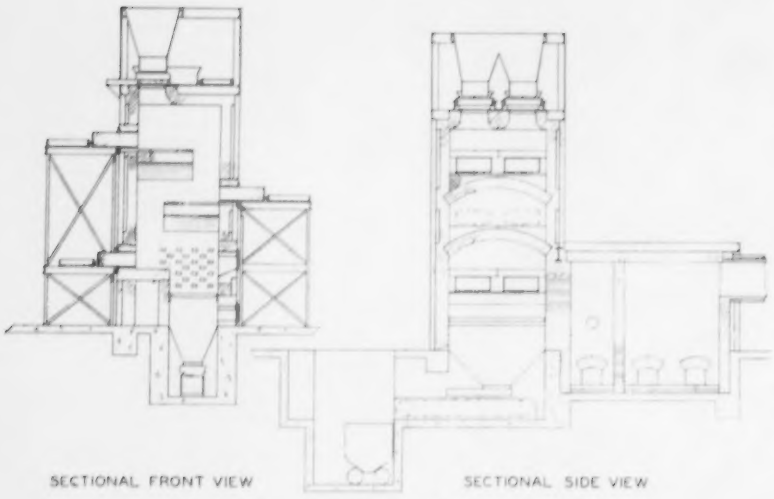


Fig. 7—The plant's specially designed incinerator.

inal water content of the waste material had to be evaporated.

An incinerator is provided to burn the solid material after centrifuging. This incinerator was designed especially to handle solid wastes containing oil and free carbon and with a reasonable moisture content. After the centrifuge material has been preheated, it supports its own combustion, maintained between 1,300° and 1,500° F. to prevent clinking. The incinerator is fed by a belt conveyor to two hoppers with electrically timed gates (Fig. 7).

Three stationary hearths in series provided with pneumatic rams handle the solid material and a flow of preheated air enters at the top of the incinerator. The secondary combustion chamber handles the volatile material with a third chamber for fly-ash removal. Approximately 25 tons per day of solids is charged to this incinerator. A trash destructor has been ordered to handle some 4 tons per day of waste paper and miscellaneous material. This unit is designed similarly to municipal disposal units and it will use the same stack as the main incinerator.

Waste Treatment Necessary

The most significant development in the problem of pollution abatement in Canada has been the recognition by management that waste treatment is a necessary part of production costs. Industry recognizes that "serving the public" has now come to include maintenance of reasonable standards of effluent quality.

The remaining problems, which are mainly technical ones, will be solved in the near future as a result of the combined efforts of government and industry. Many companies have instituted their own research programs on solving specific waste problems, especially in the petroleum industry in which departments have been created whose responsibility is the prevention of losses and the control of pollution.

The problem has been recognized, industry has assumed the responsibility, and with the cooperation of everyone interested in maintaining high standards of purity in the air and in waterways, the problem is well on its way to solution.

Acknowledgment . . . The author wishes to thank the following for their assistance and guidance in preparing this paper: (1) Dow Chemical Co., Ltd., Midland, Mich.; (2) Infilco, Inc.; (3) American Incinerator Corp.; (4) Bird Centrifuge Co.; (5) Standard Oil Development Company (Esso Engineering); and (6) Imperial Oil, Ltd. (Sarnia Refinery).

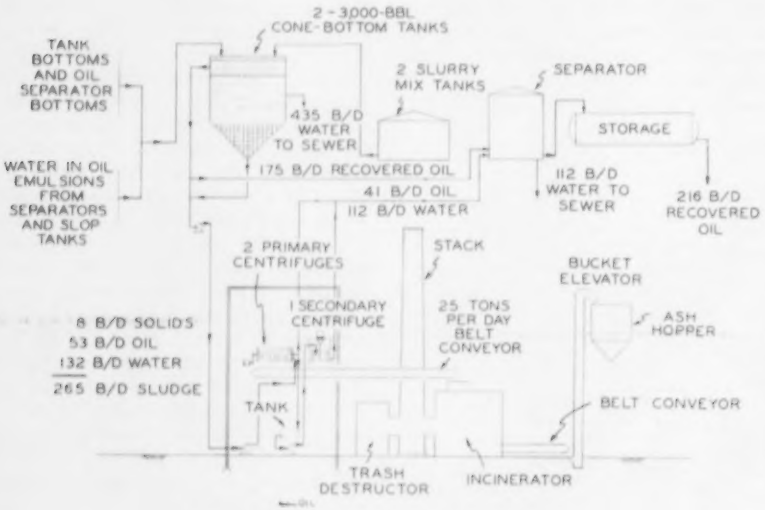


Fig. 8—Detailed diagram of waste-disposal plant.

Minimizing Tank Corrosion

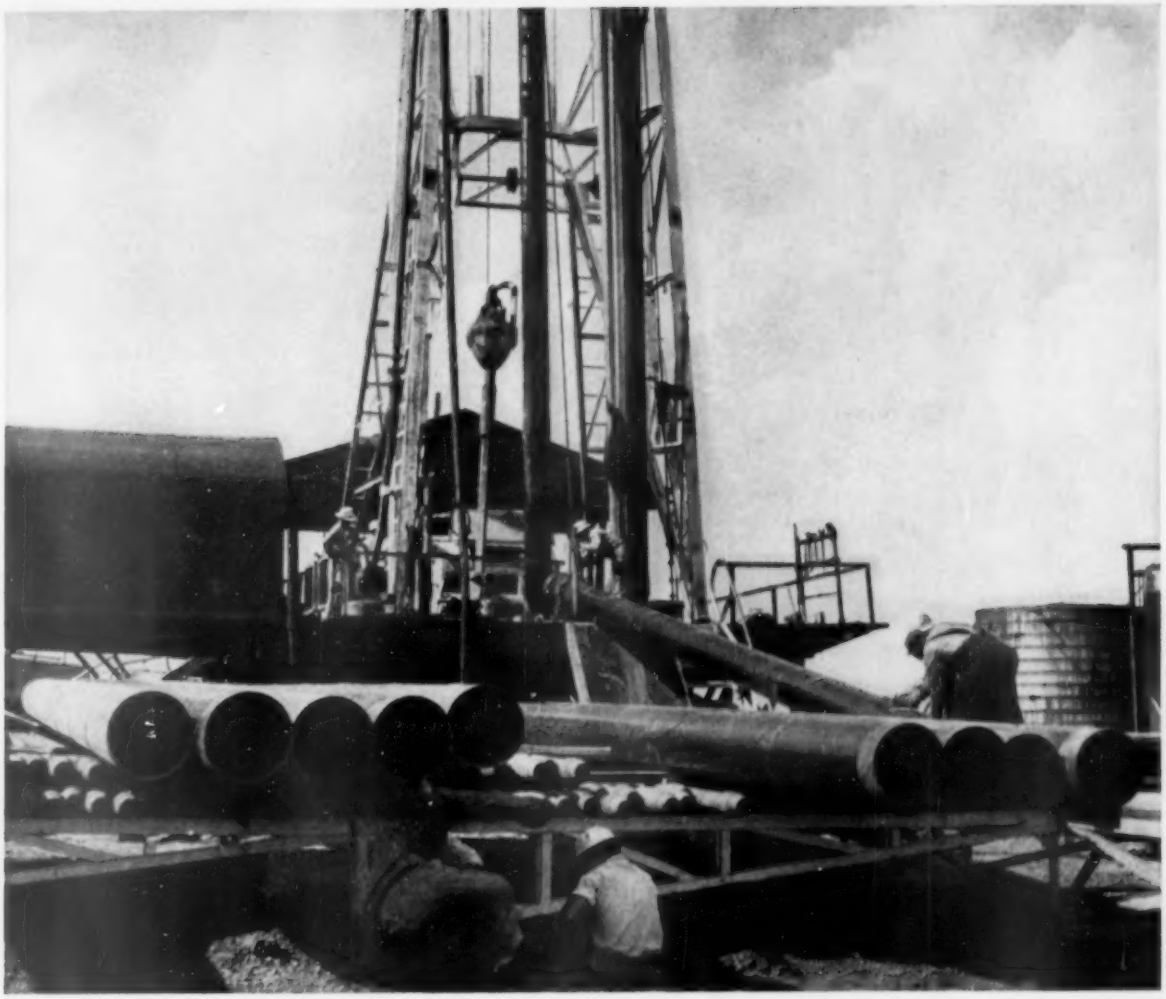
CORROSION has been minimized through use of galvanized steel in equipment designed to minimize vapor losses in products storage tanks.

The fundamental purpose of modern liquid-storage equipment is to prevent evaporation of volatile liquids and at the same time decrease the fire hazard. It is imperative, therefore, that the equipment be structurally secure.

The most important component of the complete roof is the seal, which must trap the vapor between an outer pontoon and the tank shell, and maintain this condition at all oil levels. It is divided into three parts: the primary seal, the secondary seal, and the top seal. The primary seal consists of a flexible metal shoe and a vaporproof curtain.

The shoe is a circumferential band of heavy, zinc-coated galvanized steel, ranging in size from 25 to 150 ft. in diameter, or more, and in various heights up to 44 in., depending upon the tank size. It has to be able to withstand corrosion and abrasion and to cope with irregularities in shell shape, since it maintains a sliding contact with the tank shell.

Corrosion resistance is paramount because the surfaces are exposed to more than usually encountered corrosive atmospheres, e.g., if sour crude is stored the corrosion conditions are extreme. Shoes would last less than 2 years if they were not galvanized. Galvanized shoes, however, as used in Wiggins Hidek and Lodek floating roofs, have stood up well for upwards of 8 to 10 years.



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March 16, 1954

Mr. George R. Brown
Executive Vice President
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Dear Mr. Brown:

The rehabilitation of our alkylation unit and its conversion from hydrofluoric to sulfuric catalyst type was completed by your people last month and put into immediate operation. The work was finished in a hundred and one working days from the date you were given the contract.

This work, I believe, sets a record in two cases: first, in time of completion; and, second, in the fact that the plant started up immediately on completion, was gradually brought up to capacity, is running at more than designed capacity, is running at full designed specifications and has required no substantial change of the equipment as completed.

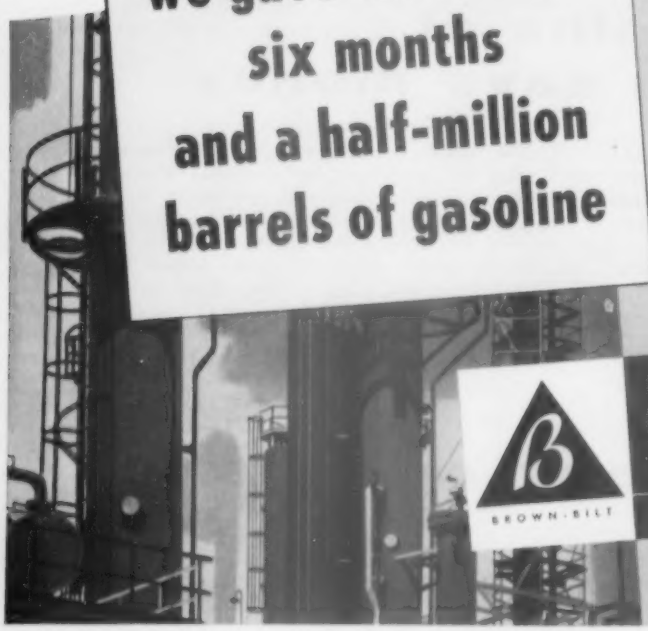
As I told you shortly after this job began, it was of great importance for us to finish it promptly and have it in operation at full capacity immediately upon completion. You personally stated that you would do everything you could to expedite the completion and that it would be a good job. You have certainly complied in both instances.

I want to thank you personally, and for my associates in the company, on the job you did for us and I wish you would convey to your associates who worked on this construction, our grateful appreciation and thanks.

Sincerely yours,

R. B. Kahle

we gave them back six months and a half-million barrels of gasoline



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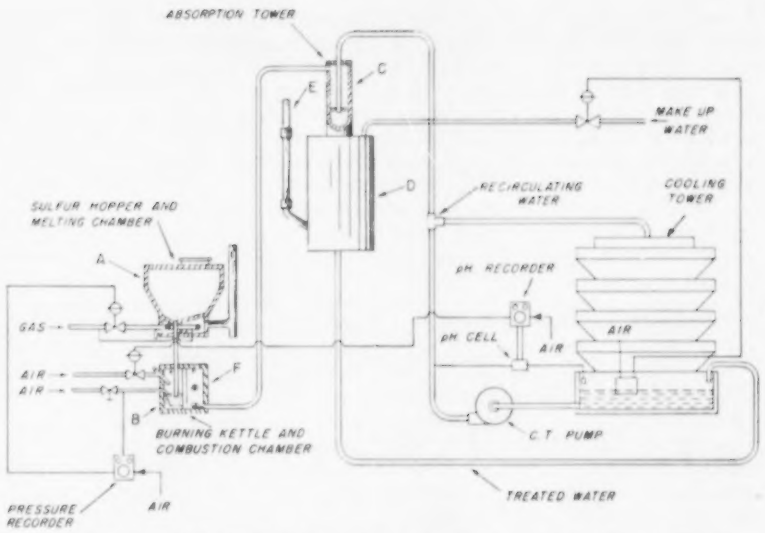


SCHEMATIC LAYOUT of automatic cooling-water treating equipment. Fig. 1.

SULFUR BURNER and absorber tower, commercial installation of automatic cooling-water treating equipment. Fig. 2.

Chemical costs drop sharply in this installation for

Automatic Treating of Cooling Water

A fully automatic installation for treating cooling water is described. This requires only weekly tests for supervising treatment, and has reduced costs of chemicals from 50 to 75 per cent below former treatments. Only two treating chemicals are used; namely, sulfur and a corrosion inhibitor. Sulfur is burned in a specially designed burner, with the rate of burning regulated by a recording pH controller. The corrosion inhibitor serves also as an algaecide and bacteriacide, so that by the use of these two treating chemicals a means has been found of alleviating the most important cooling-water problems.

by J. T. Russell

INVESTIGATIONS on a pilot-plant scale were made in an effort to develop a sulfur burner satisfactory for operation by a recording and controlling instrument responsive to the alkalinity of the cooling water. A recording pH controller was selected in this case, since a fairly satisfactory correlation exists between pH and alkalinity of a water. The features such a sulfur burner, and those of the cooling-water treating system of which it comprises a part, should possess were defined as follows:

1. It should operate reliably over long periods and require a minimum of maintenance.

2. It should be fully automatic in operation and require only weekly chemical tests as a means of checking the cooling-water treatment.

3. It should be so constructed that various capacities could be obtained by simple alteration of a standard-design equipment.

4. It should operate on natural draft and discharge exhaust gases at a safe height.

5. It should be readily amenable to automatic operation.

6. It should be capable of location some distance from a cooling tower—this as a safety measure when inflammable gases or vapors are being handled.

7. It must be capable of handling the sublimed sulfur which is produced when the controlling instrument shuts off the supply of combustion air.

Author is with Panhandle Eastern Pipe Line Co. Taken from paper presented at Oil and Gas Power Conference, A.S.M.E., at Kansas City, June 14-17, 1954.

Automatic Water-Treating System

An automatically controlled cooling-water treating system employing a sulfur burner possessing these features is shown in Fig. 1, in which sulfur from hopper A is melted as needed and fed to combustion chamber B, where combustion produces sulfur dioxide which is absorbed by a sidestream of cooling water in tower C. Makeup water is mixed with the acidic side stream water on a perforated plate in tower D, resulting in a partial neutralization of the alkalinity of the makeup water. Unabsorbed gases are vented through E. The stream of the combined makeup and sidestream waters is returned to the cooling tower by gravity.

A sample of the cooling water is passed through the cell of a recording pH controller which regulates the flow of combustion air, and consequently the production of acidic sulfur dioxide. As shown, the back pressure in a line carrying a slight flow of air, which escapes beneath the surface of molten sulfur in B, is recorded by a pressure controller, the output air pressure from which regulates the gas supply to a melting-chamber burner, so that molten sulfur is supplied as needed to maintain a level in B. Secondary combustion chamber F is provided with a pilot burner to ignite any sublimed sulfur escaping from combustion chamber B. A louver in chamber F admits sufficient air for the combustion of any sublimed sulfur and an excess for the oxidation of sulfites formed in tower D

to sulfates. Water from the sprays in C performs the dual service of absorbing sulfur dioxide from the combustion gases and of inducing a draft.

It has been found that the bubbling of air upward through the molten sulfur in chamber B has the beneficial effect of preventing any gangue formation from extinguishing combustion of the sulfur at very low burning rates. Gangue is removed to the edges of the burning surface much as waves move debris on a lake to the shore. This stream of bubbling air, in addition to providing a means of controlling the level of sulfur in chamber B, also serves as a pilot to keep the sulfur aflame when combustion air flow is shut off by the recording pH controller. Heat released by the pilot flame also serves to keep the sulfur molten during such times.

Where low rates of sulfur burning are required by the application it has been found necessary, to provide sufficient heat when combustion air is shut off, to supply gas along with the air to the bubbler tube. This presents a certain explosion hazard, and is discouraged except where absolutely necessary. The burner design provides for ample internal insulation, so that heat losses are quite low and the need of such additional heat is rare.

It has been found advantageous to provide a single design of automatic cooling-water treating system and vary the capacity of the sulfur burner as needed by altering the burning area, the location of refractory walls in B being varied to obtain the required capacity.

In order to hold cooling-water concentration within safe limits, a controller is provided to maintain set dissolved-solids contents. Dissolved-solids content is related in a fairly satisfactory manner to conductivity of the water and the controller allows cooling water to run to waste when the set value of the conductivity is exceeded. A level control on the cooling tower admits makeup water as needed. The alkalinity of this makeup water is reduced in mixing with acidic water in chamber D. This reduces the difference in alkalinity between the cooling water and the makeup water, and tends to improve control.

Commercial Application—Gasoline Plant

The sulfur burner and absorber tower of a fully automatic installation for treating cooling water is shown in Fig. 2. A control panel is provided for this installation, with a recording pH controller, recording pressure controller for supplying molten sulfur as needed, dissolved solids controller, and amplifying unit for the recording pH controller. This control panel is located in a building approximately 40 ft. from the sulfur burner it controls. This installation treats between 25,000 and 70,000 gal. of makeup water per day, for a gasoline plant.

Since the cooling tower shown in the background of Fig. 2 is handling flammable gases and vapors, safety considerations demand that the open flame of the sulfur burner be at some distance removed; in this case the distance is approximately 400 ft. Besides safety, locating the sulfur burner some distance from the cooling tower is believed advantageous in that the longer retention in the line between the burner and the tower favors the conversion of sulfites to sulfates.

The conversion of sulfite to sulfate by oxygen in the water absorbed from the atmosphere is the foundation of the prevention of scale by alkalinity control with a sulfur burner, a point apparently lacking emphasis by previous writers. Calcium sulfite is little, if any, more soluble, depending on the temperature, than calcium carbonate. The respective solubilities are given in Table 1.

From Table 1, it can be seen that were it not for the ready reaction of sulfites with oxygen from the atmosphere to form the more soluble sulfate, the use of sulfur burners for scale prevention would be without merit. The solubility of calcium sulfate is included in the table for comparative purposes.

Analyses of the makeup and cooling waters are shown in Table 2.

Commercial Application, Compressor Station

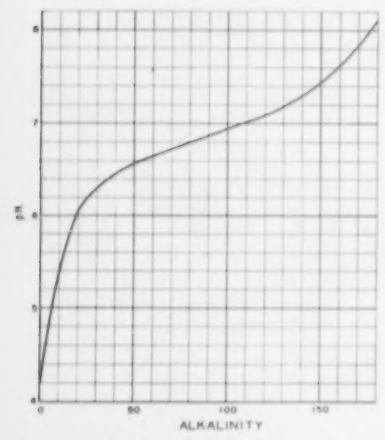
Another fully automatic installation for treating cooling water, similar in all respects to that illustrated in Fig. 2, was provided at an 11,000-hp. com-

TABLE 2—ANALYSES OF GASOLINE-PLANT COOLING AND MAKEUP WATER, P.P.M.

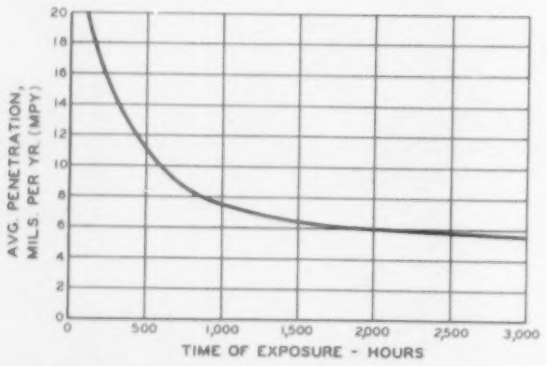
	Cooling water	Make-up water	Ratio
Silica (SiO_2)	70.5	13.3	5.3
Iron (Fe^{++})	0.0	0.0	...
Alumina (Al_2O_3)	2.8	1.5	1.9
Calcium (Ca^{++})	318.2	70.8	4.5
Magnesium (Mg^{++})	57.6	14.0	4.1
Sodium (Na^{+})	131.3	59.6	2.2
Bicarbonates (HCO_3^{-})	22.0	219.6	...
Carbonates (CO_3^{--})	0.0	0.0	...
Chlorides (Cl^{-})	54.0	24.0	2.3
Sulfates (SO_4^{--})	1,172.7	144.1	...
Total dissolved solids	1,829.1	546.9	3.6

TABLE 1—RESPECTIVE SOLUBILITIES OF CALCIUM SULFITE AND CALCIUM CARBONATE

	Solubility in water, p.p.m.		
	Calcium sulfite ($CaSO_3.2H_2O$)	Calcium carbonate ($CaCO_3$)	Calcium sulfate ($CaSO_4.2H_2O$)
Cold water	43	14	2,410
Hot water	11	18	2,220



pH VS. TOTAL ALKALINITY, gasoline-plant makeup water. Fig. 3.



CORROSION RATE VS. TIME, compressor-station cooling water treated with corrosion inhibitor. Fig. 4.

pressor station. In addition to the cooling water for the engines and compressors, the cooling tower had to handle sufficient water to cool 135,000 M.c.f. per day of natural gas at a temperature ranging between 240° and 260° F. Previously, the cooling water had been treated with a zeolite softener, and the tubes of all atmospheric sections in the cooling tower were scale-free. After 8 months of operation of the fully automatic cooling-water treating equipment, the tubes of these atmospheric sections are still scale-free. This installation requires only an occasional shaking down of the sulfur in the hopper (to prevent bridging) and weekly tests to check the performance of the dissolved-solids and pH controllers.

Corrosion Mitigation

Readings of pH in the neighborhood of 6 are being maintained by the controllers of these automatic cooling-water treating installations, and this is because such pH values are necessary to assure sufficient reduction in total alkalinity of the cooling water to prevent carbonate-scale deposition. The relation of pH to total alkalinity of the gasoline-plant makeup water is shown in Fig. 3. This figure was obtained by titrating 1 l. of the water with tenth-normal sulfuric acid.

Within recent years a number of inhibitors for water-side corrosion have reached the market. Fig. 4 shows the results of corrosion tests using the nipple method with the compressor-station water treated with inhibitor as the corrosive medium. It has been stated that in treated-water systems corrosion rates in excess of 5 to 10 mils per year were excessive. It will be observed from Fig. 4 that corrosion rates well within the range for satisfactory control are being maintained when the pH of the cooling water is held near 6 at all times.

Treatment Costs

Cost of chemicals for the cooling-water treatment described in this paper are as follows:

	Chemical cost—cents per 1,000 gal.	
	Gasoline plant	Compressor station
Sulfur	0.60	0.69
Corrosion inhibitor	1.50	1.50
Total	2.10	2.19
Sulfur, per ton		$26.00
Inhibitor, per gal.		1.50

These costs range between 25 and 50 per cent of the costs of chemicals for the cooling-water treatments previously used. Experiments are currently in progress with a newly developed corrosion inhibitor. Should this inhibitor prove effective, chemical costs will be reduced still further.

Lost Circulation Plagues Cambrian-Trend Drilling

(Continued from page 93)

powered by three motors using either natural gas or butane.

Great Western Drilling Co. uses a 129-ft. rig powered by two diesel motors and a 7½ by 16-in. pump and a 27½-in. oil-bath rotary table.

Mud program . . . Main mud problems on the trend are lost circulation, sloughing Smithwick (Bend) shale, and drilling the reef limestones. Mud costs run between $1,500 and $2,500 per well, but occasionally these costs soar and in isolated instances have been 8 or 10 times the average.

Prior to setting surface pipe mud costs are relatively low, although lost circulation may occur in the shallow water sands. Fresh-water mud treated with 5 to 8 lb. per barrel of Fibertex will overcome slight losses, and 25 to 30 lb. per bbl. will normally prevent even the most severe losses in these shallow sands.

In eastern Nolan County, it may be necessary to use mud-tank pits rather than earthen pits on filled locations to prevent lost returns in the mud pits.

Gypsum, salt, sloughing red beds, and high calcium sulfate of makeup water affect the mud while drilling the Permian beds. Some of these problems are overcome by starting mud viscosity and weight control at 1,500 to 2,500 ft.

During the early stages of drilling, fresh-water bentonitic mud, treated with soda ash, is used to provide enough viscosity to clean the hole. Combinations of soda ash, caustic soda, and a chemical thinner are gradually added to the drilling mud to lower filter loss and control gel strengths. This increases the viscosity and cuts down on the trouble that may be experienced on drill-stem testing of shallow zones.

Between 3,000 and 3,750 ft., it is customary to add 50 to 100 bbl. of oil to "slick up" the hole while drilling streaks of limestone. Crooked holes and lost circulation are common in drilling the large reefs that occur between 4,200 and 5,200 ft. Most of the mud loss is in the porous parts of the reef or in open fractures when the bit has cut about 150 to 200 ft. into the reef limestone. While making connections, round trips, or while drilling in the reef, the drill pipe may become stuck. However, addition of oil to the mud helps free the pipe.

Cottonseed hulls, can and wood fibers, Magcofiber, Fibertex, Jelflake, and other lost-circulation materials are used to reestablish circulation. Baroid engineers recommend Fibertex and Jelflake in a ratio of 2 to 1, using 5 to 20 lb. per barrel of the mixture. On reefs, it may be necessary to resort to cementing to restore lost circulation.

Water from the Coleman Junction can invade the hole during periods of lost circulation, and it contains salt, gypsum, and sulfur compounds. This water must be eliminated on regaining returns, or the mud must be heavily treated with chemicals to maintain the desired filter loss.

Mud weight is very important below 5,000 ft. because excess weight may cause mud loss and too low a weight will not give required hydrostatic head while drill-stem testing the Caddo and Cambrian pay zones.

Caving of the Atokan Smithwick shale into the hole in parts of the area is eliminated if the mud has a high viscosity, high gel strength, low filter loss, and low pH. If the mud is not properly treated, the bottom of the hole can fill with cavings and shale boulders after trips. Occasionally it is necessary to run a basket or core barrel to remove these large boulders.

The average mud cost per well runs from $1,500 to $2,500 with the difference in cost depending on the filter-loss requirements and the individual operator. However, these costs may vary from $1,000 to $15,000 in two wells in the same area. Typical mud properties of an average well are shown in Table 2, and the effect on the mud properties after adding crude or diesel oil is shown in Table 3.

Time required to drill a Cambrian well may be increased from 30 to 60 days because of time spent in straightening crooked hole, lost circulation, fighting sloughing shales, and extended surface casing operations.

Acknowledgment

Much of the information on mud programs was obtained from an article by John T. Blaney, Jr., entitled "Fabulous Nolan County," Baroid News Bulletin, March-April 1954, pp. 4-9.

References

1. Troutman, Arthur, "The Cambrian Trend in Western Texas," published by Five-Star Oil Report, Inc., April 2, 1954.

2. Stratigraphic Committee of the Abilene Geological Society, "Composite Electric Log-Columnar Section (Diagrammatic) of Subsurface Formations in Southeastern Coke County, Texas 1954)."

(For additional references see The Oil and Gas Journal, July 5, 1954.)

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Getting the Most Out of Mud Equipment—1

by E. E. Huebotter,* T. H. Dunn†, and Frank Bell‡

FIG. 1 shows two inexpensive, simple, chemical barrels that can be used in preparing fluid-treating mixtures. They are for sale in most oil fields or can be made on location with scrap material. Many mixers of more elaborate design are available which do a quicker and more thorough job, but usually one of the two simpler pieces of equipment is adequate. Also shown is a modified-cone-and-jet-type mixer that is quite effective for suspending dry additives into drilling fluids. It is reasonable to buy or can be fabricated on location. Equipment for this same purpose is now available that does not require a standby pump on the rig or bleed down the rig's pump pressure, but it is considerably more expensive than the modified-cone-and-jet-type mixer and requires auxiliary power.

Method of addition . . . Additives should be introduced into the drilling fluid as soon as possible after jetting down the pits to avoid discarding freshly added materials. Additions designed to reduce viscosities, gel strengths, and foaming (in order to drop sand and silt or to release entrained air or gas in the pits) should be made to the drilling fluid immediately after it passes through the screen to prevent loss over the screen and hence result in maximum effectiveness.

All other materials should be added through a mixer at the suction of the well pump to assure all material going into the drilling fluid and giving it maximum agitation through the pump, drill pipe, bit, and hole. The rate of addition should be regulated slow enough so that lumps of the additive do not form. Lumps that are not dispersed in one circulation through the hole are screened out and wasted.

Agitation . . . Usually the yield to be expected from most additives will depend upon the amount of mixing they receive. A high degree of mixing over a short period of time will ordinarily, but not always, serve as well as a low degree of mixing over a long period of time.

A notable example of the effect of the degree and time of mixing is the yield of montmorillonite and attapulgite. Both montmorillonite (mined as bentonite and sold under many trade names for use in fresh-water drilling muds) and attapulgite (sold under many trade names for use in salt-water drilling muds) yield very rapidly with violent agitation, as shown in Fig. 2, to attain their maximum yield after about 1 hour.

However, with less-violent agitation as is received in many drilling-fluid circulatory systems, maximum yield for montmorillonite was not attained until after 3 hours agitation; whereas that of attapulgite was not attained even after 100 hours of agitation. Frequently the degree of mixing received by circulating the drilling fluid through the well is inadequate to obtain the proper yield from the materials added, and additional materials are required to attain the properties desired in the drilling fluid.

Proper yield can be attained by the use of additional agitation equipment such as a standby pump circulating through guns, or homogenizers, or a mechanical agitator in the mud pits to secure the necessary agitation. When pump pressure to circulate the well is not critical, a homogenizer installed in the standpipe will usually accomplish the desired results.

*Baroid, Tulsa. †Stanolind Oil & Gas Co., Tulsa. ‡Shell Oil Co., Wichita Falls, Tex. From a paper presented at Mid-Continent District meeting, A.P.I. Division of Production, Oklahoma City, March 19, 1954.

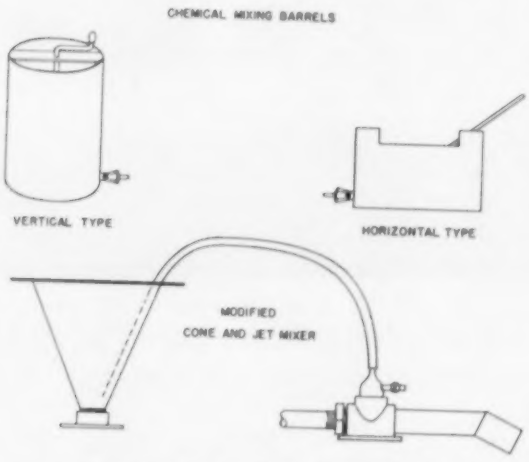

Fig. 1—Types of chemical mixing devices.

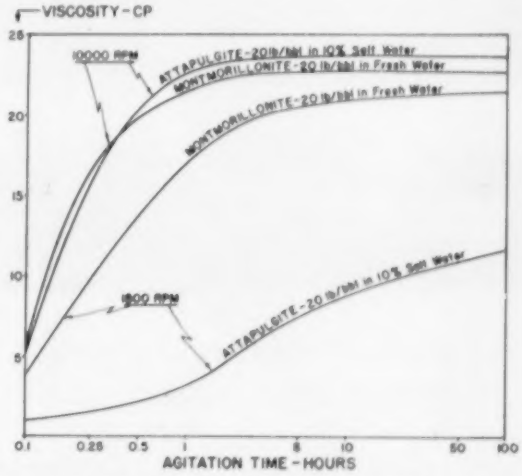

Fig. 2—Comparative mixing times for attapulgite and montmorillonite.

Every minute, day in day out, 1,200,000 cubic feet of natural gas are pushed through pipe lines by the 220,000 horsepower in our booster stations.

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Oxidation Stability of Jet Fuels—5

by J. W. Thompson

Further discussion of jet-fuel oxidation-stability results is given in this last installment of the series.

THE response of the antioxidants in fuel C by the induction-period method is illustrated in Fig. 4 (Installment No. 3). The antioxidant potencies based on these curves, at both constant antioxidant concentration and at various induction-period levels, are shown in Table 5.

For convenience in comparing the various methods of rating the antioxidants, these ratings in fuel C are consolidated in Table 6.

The effects of copper on jet-fuel stability and the deactivation of copper were studied in fuel C by both the accelerated gum and induction-period methods. The results obtained are shown in Table 7.

Comparison of antioxidant types . . . In order to simplify the presentation of antioxidant-potency data, the results of 16-hour accelerated gum tests (air-evaporation method) will be considered first since this test is the basis of present military requirements for stability. The correlation of these data with those of the other accelerated procedures will follow.

The curves in Figs. 1 and 2 (Installment No. 3) show that antioxidants vary considerably in their ability to stabilize jet fuel satisfactorily. The inhibitor-replacement values in Table 2 (Installment No. 3) indicate that the ratings for all the antioxidants, except butylated 4-methoxyphenol, agreed reasonably well in two different fuels (C and D) and at both the 20 and 50-mg. gum levels. p-Butylaminophenol was found to be the most potent of the five antioxidants. Of the three specification inhibitors, the two studied were found to be quite different in effectiveness, the phenylenediamine type being superior to the alkylated phenol type.

Thus, the N,N′-di-sec-butyl-p-phenylene-diamine had an average inhibitor-replacement value of 0.55 at two gum levels in fuels C and D (0.55 part p-butylaminophenol = 1.00 part phenylenediamine derivative). The second specification inhibitor, 2,6-di-tert-butyl-p-cresol, had an average inhibitor-replacement value of only 0.14.

In regard to the other antioxidants, butylated 4-methoxyphenol was moderately active (0.37 average value), and 2,2′-methylenebis(6-tert-butyl-p-cresol) had an average value of only 0.11. Both of the latter compounds have been proposed for improving the oxidation stability of

Author is with research laboratories, Tennessee Eastman Co., Kingsport, Tenn., a division of Eastman Kodak Co.

TABLE 5—ANTIOXIDANT POTENCY IN JET FUEL C BY INDUCTION PERIOD METHOD

Antioxidant—	Inhibitor ratio*: Induction period, minutes	Inhibitor ratio*: Ratio	Inhibitor replacement value at following induction periods†: 11.3 hours	16 hours	Average
p-Butylaminophenol	950	1.00	1.00	1.00	1.00
N, N′-Di-sec-butyl p-phenylenediamine	670	0.63	0.55	0.48	0.51
Butylated 4-methoxyphenol	460	0.35	0.29	0.28	0.29
2,6-Di-tert-butyl-p-cresol	290	0.12	0.11	0.12	0.12
2,2′-Methylenebis(6-tert-butyl-p-cresol)	275	0.10	0.09	0.11	0.10
None	200				

*At 0.0025 weight per cent concentration vs. p-butylaminophenol. †Parts p-butylaminophenol replaced by one part other antioxidant.

TABLE 6—ANTIOXIDANT POTENCY RATINGS IN JET FUEL C BY VARIOUS METHODS

Antioxidant—	Inhibitor replacement value: Gum vs. concentration method*	Inhibitor replacement value: Induction-period method	Inhibitor ratio: Gum-time method*	Inhibitor ratio: Induction-period method
p-Butylaminophenol	1.00	1.00	1.00	1.00
N,N′-Di-sec-butyl-p-phenylenediamine	0.61	0.51	0.48	0.63
Butylated 4-methoxyphenol	0.33	0.29	0.31	0.35
2,6-Di-tert-butyl-p-cresol	0.13	0.12	0.10	0.12
2,2′-Methylenebis(6-tert-butyl-p-cresol)	0.11	0.10	0.08	0.10

*Average of values of 20 and 50-mg. gum levels, using steam-jet method.

TABLE 7—COPPER DEACTIVATION IN JET FUEL C

Additives in fuel: Antioxidant* (0.0033 wt. %)	Additives in fuel: Cu added, mg. per liter	Additives in fuel: Deactivator,† wt. per cent	Accelerated gum (16-hour, steam), mg. per 100 ml.	Induction period, minutes
0	0	0	240.5	240
0	1.0	0	249.5	150
BAP	0	0	13.4	>1,600
BAP	1.0	0	235.0	325
BAP	1.0	0.0013	6.5	>1,600
BAP	0	0.0013	7.0	>1,600
BPD	0	0	211.2	670
BPD	1.0	0	260.5	250
BPD	1.0	0.0013	9.2	>1,600
BPD	0	0.0013	8.3	>1,600
0	0	0.0013	232.4	300

*BAP is p-butylaminophenol; BPD is N,N′-di-sec-butyl-p-phenylenediamine. †Deactivator used was N,N′-disalicylidene-1,2-propanediamine.

various materials, including petroleum products.

There has been considerable interest in the steam-evaporation method as a possible replacement for the air-jet procedure for soluble-gum determination. Both methods were used in evaluating the antioxidants in fuels C and D. The inhibitor-replacement values in Table 2 (Installment No. 3) indicate that both methods gave approximately the same rating to each antioxidant.

For example, N,N'-di-sec-butyl-p-phenylenediamine had an average value of 0.55 by the air method and 0.59 by the steam method. However, the steam procedure showed better agreement of individual values making up each average. Generally, the steam gum values at 500° F. were about 30 to 50 per cent of the corresponding air gum values at 400° F. All existent and accelerated gum values were based on duplicate evaporations, and both air and steam gum methods provided about the same degree of agreement between duplicates.

Comparison of Ratings by Different Accelerated Tests

The antioxidant ratings in fuel C, obtained from the accelerated gum vs. oxidation-time curves of Fig. 3, are expressed as inhibitor ratios in Table 4 (Installment No. 3). The ratings at the 50-mg. gum level were similar to those at the 20-mg. level.

A comparison of these inhibitor ratios with the inhibitor-replacement values from the gum vs. concentration method indicates reasonably good agreement between the two methods. Thus, 2,6-di-tert-butyl-p-cresol had an average inhibitor-replacement value of 0.12 and an inhibitor ratio of 0.10.

The antioxidant ratings obtained in fuel C by the induction-period procedure were of particular interest. The induction-period vs. antioxidant-concentration curves (Fig. 4 of Installment No. 3) were used to compare the antioxidants at both constant concentration and at two induction-period levels. One of the selected induction periods was 16 hours, corresponding to the oxidation-test time of the military specification. The results in Table 5 indicate that the antioxidants were rated similarly by both methods of evaluating the curves. Furthermore, these induction-period ratings agreed rather well with the potencies determined by the accelerated gum procedures, as seen in Table 6.

For example, N,N'-di-sec-butyl-p-phenylenediamine had the following values by the different methods: inhibitor-replacement value (gum vs. concentration = 0.61; inhibitor-replacement value (induction period) = 0.51; inhibitor ratio (gum time) = 0.48; and inhibitor ratio (induction period) = 0.63. Of course, the induction-period procedure is limited to fuels showing a definite induction period and thus cannot be applied to many jet fuels.

Copper Effects and Deactivation

These studies involved the application of 16-hour accelerated gum and induction-period tests to samples of fuel C containing various combinations of added copper, inhibitor, and deactivator. The results are shown in Table 7. The addition of 1.0 mg. of dissolved copper per liter of fuel was found to be definitely harmful to fuel stability, either uninhibited or inhibited with the phenylenediamine or aminophenol antioxidant types. However, the deactivator, N,N'-disalicylidene-1,2-propanediamine, was effective in nullifying the catalytic activity of copper. For example, the fuel containing p-butylaminophenol alone had an accelerated gum content of 13.4 mg. per 100 ml., which was increased to 235 mg. per 100 ml. upon addition of copper.

The addition of deactivator to the inhibited, copper-containing fuel caused accelerated gum to be reduced to 6.5 mg. per 100 ml. This same situation is evident in the induction-period values for these compositions. Even in the absence of added copper, the uninhibited and inhibited samples were rendered more stable by deactivator. Such improvement was probably due to deactivation of the copper that was present in the fuel as received.

Acknowledgment

The author wishes to express his appreciation to E. M. McMahon for reviewing the manuscript and to J. C. Ownby for assistance in the experimental work. The interest and encouragement of C. G. Dryer and Alan Bell in the investigation are gratefully acknowledged.

New Aluminum Pipe Has Builtin Steam Line

PIPING users who handle sluggish materials such as tar and pitch or tricky solutions such as ammonium nitrate need heated lines to prevent their products from solidifying or crystallizing in the line. In contrast to normal methods of heating lines by using an external steam jacket or steam tube to apply the necessary heat, Unitrace is so produced that the steam line is an integral part of the pipe. It is extruded as a single unit from Alcoa 3S-F aluminum alloy. The size now available has the pipe dimensions of 2-in., Schedule 40 pipe.

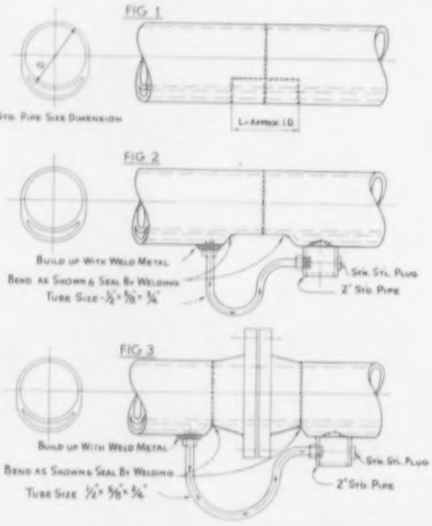
FIG. 1
D = Std. Pipe Size Dimension
L = Approx. I.D.
FIG. 2
Build up With Weld Metal
Bend as Shown & Seal By Welding
Tube Size - ½" x ⅝" x ¾"
Std. Stl. Plug
2" Std. Pipe
FIG. 3
Build up With Weld Metal
Bend as Shown Seal By Welding
Tube Size ½" x ⅝" x ¾"
Std. Stl. Plug
2" Std. Pipe

Diagrams showing some possible methods of joining "Unitrace" pipe. TOP—Welding without use of pipe fittings or jumpers. MIDDLE—Use of jumpers for adjacent lengths of pipe, joined without fittings. BOTTOM—Use of both jumper and welding fittings.

In the first application, it resulted in the following savings over conventional 2-in. steam-jacketed lines: 38 cents a foot saved on material; 5 cents a foot saved on insulation; and 30 per cent reduction in labor costs.

"Unitrace" is the result of joint engineering efforts by Aluminum Co. of America and Hercules Powder Co.

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by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

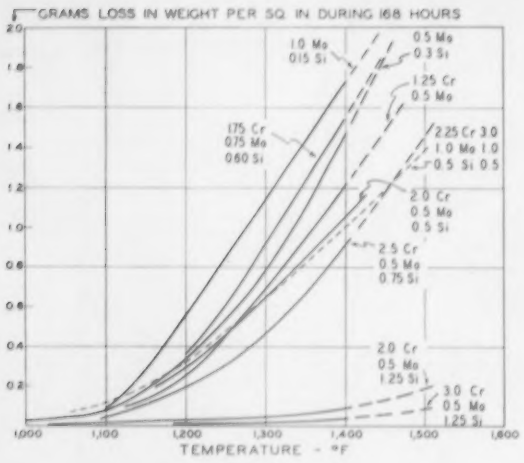

Fig. 1.

Reducing Still-Tube Burnouts

"Our still tubes burn out and replacements must be made on each shutdown. What kind of tubes should we use to keep down the burnouts? Our crude oil contains very little sulfur." S.P.M.

In the absence of "sulfide" corrosion and if indeed such corrosion is not occurring, the best types of tubing materials are those that contain more than the customary amounts of silicon and contain 2 or 3 per cent of chromium. For very severe conditions or at extremely high tube temperature, even higher percentages of chromium (5-9 per cent) may be useful. Molybdenum, although it increases high-temperature strength, greatly harms the resistance to oxidation. This probably accounts for the fact that the use of 1 per cent molybdenum steels has decreased during the last 10 years.

These effects are clearly indicated in Fig. 1 taken from data of R. F. Miller, "Intermediate Alloy Steels at Elevated Temperatures" (Petroleum Engineer, January 1948, p. 178). Note that increasing of the silicon content to 1.25 per cent (from 0.5 and 0.75 per cent) decreases the oxidation almost tenfold. Reductions in oxidation can be examined in Table 1. The adverse effect of molybdenum cannot be shown as clearly because the silicon contents (and chromium contents) of the steels were not fixed, but Table 2 indicates that modybdenum harms oxidation resistance or at least is not helpful.

TABLE 1—BENEFICIAL EFFECT OF SILICON ON OXIDATION RESISTANCE.

Steel			Oxidation—gms. per sq. in. (168 hr.)	
Si	Mo	Cr	at 1200° F.	at 1400° F.
0.5 max.	0.5	2.0	0.29	1.04
0.75	0.5	2.5	0.20	0.90
1.25	0.5	2.0	0.03	0.09
1.25	0.5	3.0	0.01	0.04

TABLE 2—ADVERSE EFFECT OF MOLYBDENUM ON OXIDATION RESISTANCE.

Steel			Oxidation—gms. per sq. in. (168 hr.)	
Si	Mo	Cr	at 1200° F.	at 1400° F.
0.1-0.5	0.5	—	0.35	1.49
0.1-0.2	1.0	—	0.55	1.71
0.5-1.0	0.5	1.25	0.24	1.19
0.45-0.75	0.75	1.75	0.35	1.53
0.50 max.	0.5	2.0	0.29	1.04
0.75	0.5	2.5	0.20	0.90
0.5 max.	1.0	2.25	0.32	1.01
0.5 max.	1.0	3.0	0.31	0.96

Midboiling Point and Diesel Index

In the booklet "Venezuelan and Other World Crude Oils," the relations between diesel index and characterization factor is shown but it applies only to fuels which boil from 400°-700° F. What about lower boiling fuels?" S.W.D.

Width of boiling range, in itself, has no appreciable effect on diesel index but lower-boiling materials have higher diesel indexes. Fig. 1 indicates the general relationship and it is accurate within an average deviation of only 1.3 units of diesel index.

This study (C. Chu, University of Tulsa) is based on the "National Annual Diesel Fuel Survey" of 1953 by O. C. Blade, of the U. S. Bureau of Mines (R.I. 5008). It checks exactly with data on 550° F. midboiling-point fuels published in "Venezuelan and Other World Crude Oils" (Ministerio de Minas e Hidrocarburos, Caracas, Venezuela). This reference also indicates that the relationship is the same for straightrun fuels derived from oils of all regions (West Texas, Venezuela, Middle East, etc.).

Although some of the fuels of the national annual diesel-fuel survey probably contained some cracked distillates, the relationship of diesel index to characterization factor is not the same as shown here (see Nelson, "Properties of Catalytic Cycle Stocks," *(The Oil and Gas Journal, December 14, 1953, p. 157).* The diesel index of cracked materials is vitally affected by the severity of the cracking.

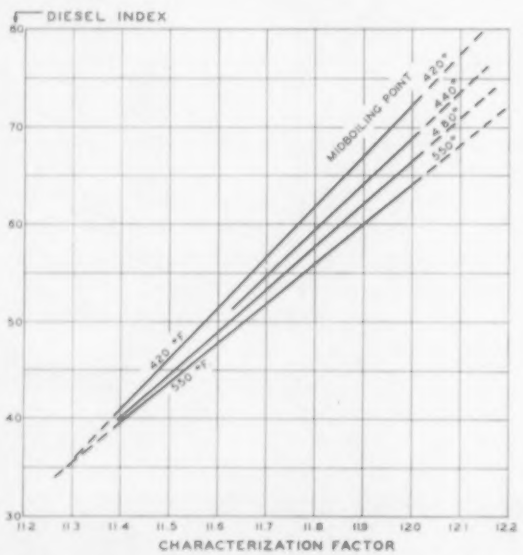

Fig. 1—Effect of volumetric average boiling point on the diesel index of straightrun fuels.

Selection of Filled-System Thermometers—4

by F. A. Faust

THE basic liquid-filled system, Class 1, is limited to 10 ft. of connecting tubing. However, where longer lengths are required and ambient-temperature variations exist along the tubing, a variation known as the fully compensated is available. This is made up of two elements and two lengths of capillary. One of these systems measures the bulb temperature plus the error caused by temperature changes along the connecting tubing. The other system measures the amount of error and subtracts it.

In similar manner, by balancing the volumes in the two systems within the case, temperature changes within the case are compensated for.

Case compensation . . . A standard or basic liquid-filled thermometer, which is only case compensated, may be used when the arithmetic product of tubing in feet and capillary ambient-temperature span is 200 or less.

A fully compensated liquid-filled thermometer must be used when the above-mentioned product exceeds 200. Furthermore, the length of tubing is limited by the following formula: Length of tubing in feet not more than 10,000 divided by capillary ambient-temperature span in degrees Fahrenheit.

The basic vapor-pressure system, Class 2, must not be used where temperatures along the connecting tubing might be higher than at the bulb. If this condition exists, a variation known as the dual filled is available. It contains in the capillary system a liquid known as the transmitting liquid which is nonvolatile throughout the temperature range of the thermometer. It is also immiscible with and insoluble in the actuating liquid.

Author is manager, educational department, Bristol Co., Waterbury, Conn. Paper presented at University of Florida instrumentation symposium, 1954.

Nonlinearity . . . If nonlinearity is objectionable, it may be eliminated by using a special conversion linkage which produces linear pen motion with respect to temperature. This device allows the use of uniform charts with a system which is inherently cheaper to produce and with over-all errors less than the comparative types of other classes. The recommended span for this type is from a minimum of 50° to a maximum of 150° F.

The gas-filled thermal system, Class 3, is capable of measuring temperatures over a wide range from —125° to +1,000° F. It is subject to capillary ambient temperature errors which may be minimized by increasing the size of the bulb or compensated for by the use of an additional compensating system, as in the fully compensated Class 1.

The mercury-filled system, Class 5, is capable of measuring temperatures from —38° to 1,200° F., or with a special filling alloy, may be used as low as —65° F. It is also subject to capillary-ambient temperature errors which may be compensated for either by an additional compensating system as in the fully compensated Class 1, or by providing a wire or invar or other low-expanding material inserted in steel or stainless-steel capillary. All parts of a mercury system must be made of ferrous material and all joints must be welded.

Costs . . . Any discussion such as this would not be complete without some reference to cost. It is hoped the following will be of some assistance in giving comparative cost information.

The lowest-priced system is the basic Class 2, vapor pressure, to which we add differentials for the various other systems such as the following: dual filled, Class 2; conversion linkage, Class 2; and dual-filled conversion linkage, Class 2.

The basic liquid-filled is the case-compensated Class 1. It covers temperatures from —60° to +500° F. and is priced $10 higher than the basic Class 2. The fully compensated Class 1 is priced somewhat higher than the case-compensated, and both are available in range steps from —61° to 125° F. and —126° to —150° F., each step at a somewhat higher price.

The basic gas-filled or Class 3 is furnished for ranges from —60° to +800° F. and is priced $10 higher than basic Class 2. Also, a small bulb-compensated Class 3, is available for the same ranges but at a somewhat higher price. Either of these may be had in ranges from 800° to 1,000° F., from —61° to —100° F., and from —101° to —125° F. at somewhat higher prices.

The basic mercury-filled thermometer is furnished for ranges from —38° to +800° F. at approximately $13 higher than basic Class 2. It is also available in ranges from —39° to —65° F., +800° to +1,000° F., and +1,001° to +1,200° F., at somewhat higher prices.

The above figures are approximate and vary with different manufacturers. They cover an instrument with a plain bulb and 5 ft. of tubing. They are intended only for comparison to assist in making cost estimates, also to give warning to check with each manufacturer for his particular price structure.

While this paper does not arrive at any standard and simple formula for selecting filled thermometers, it is hoped that sufficient information has been submitted on the many contributing factors to permit an instrument engineer to arrive at a logical selection.

Preceding installments in this series appeared as follows:

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No. 2—May 31 . . . . . page 103
No. 3—June 21 . . . . . page 177

by
Dr. R. F. Nielsen

Fluid Displacement in Linear Floods—1

This series will include three installments dealing with linear floods, one with radial floods, and two dealing with East Texas field. The electric-logging series previously appearing on this page will be resumed August 25, 1954.

FOR the displacement of one fluid by another in a porous medium, the basic laws are the continuity equation (conservation of matter) for each fluid, and D'Arcy's law as modified for relative permeability, capillary pressure, and gravity. Buckley and Leverett put these laws in a form suitable for computation, under certain conditions, of the saturation changes occurring when one fluid displaces another during linear flow.

The fractional-flow formula for oil and gas is:

$$f_w = F + \frac{F K_o A}{q_T \mu_o} \times (dP_c/dx - \Delta\rho\, g \sin\alpha) \quad (1)$$

Where f_w = the fractional flow of water; K_o = effective permeability to oil; μ_o = oil viscosity; q_T = total flow (oil and water) in direction x through cross-sectional area A; P_c = capillary pressure $P_o - P_w$; $\Delta\rho$ = water density minus oil density; α = the angle which direction x makes with the horizontal; and $g = 0.00097$ and converts cm. of water to atm.; $F = [1 + (k_o\mu_w/k_w\mu_o)]^{-1}$ where k and μ are relative permeabilities and viscosities. Units are the usual D'Arcy law units.

The "frontal-advance formula" derived by Buckley and Leverett from the continuity equation is:

$$(\partial x/\partial t)_S = (q_T/\psi A)\,(\partial f/\partial S)_t \quad (2)$$

Where t = time; $f = f_w$; and S = water saturation. This gives the rate of advance of a given saturation S. If q_T is constant, we may write:

$$(\Delta x)_S = (Q/A\psi)\,(df/dS)_S \quad (3)$$

Where Q = the total cumulative flux. Note that $A\,\psi\,\Delta x$ is the pore volume in the length Δx, if the porosity is constant.

The conditions of restraint cannot be conveniently shown by the notation, and hence much difficulty has arisen in the use of these equations. A given t and a given x determine a given saturation S in any one experiment, but df/dS at that point at the given instant is not a function of S only but of the capillary pressure gradient and hence the saturation gradient. The latter varies with time (and distance) for any given S, and it is the saturation gradient which we are trying to calculate in the first place.

However, Terwilliger et al. found, in displacing water downward at a constant rate by gas that, after a time, a saturation distribution was set up which could be regarded as made up of two zones. The frontal zone, or zone of furthest advance of the displacing fluid, retained its extent and saturation distribution as it progressed in the porous medium. It may be said to have "stabilized."

In the trailing zone, the saturations changed with time in such a manner that the relative speeds of advance of each saturation was preserved. This is shown in Fig. 1, for displacement by the nonwetting fluid.

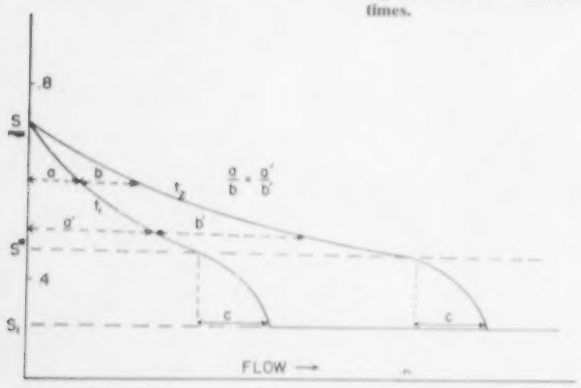
In a laboratory flooding experiment with a long core of uniform (immobile) initial water saturation S_i (the rest being oil), the core is horizontal, so the sin α term of Equation 1 drops out. A constant-rate water flood is started at one end. In predicting the displacement history, a plot of F against S is made from relative permeability and viscosity values (Fig. 2).

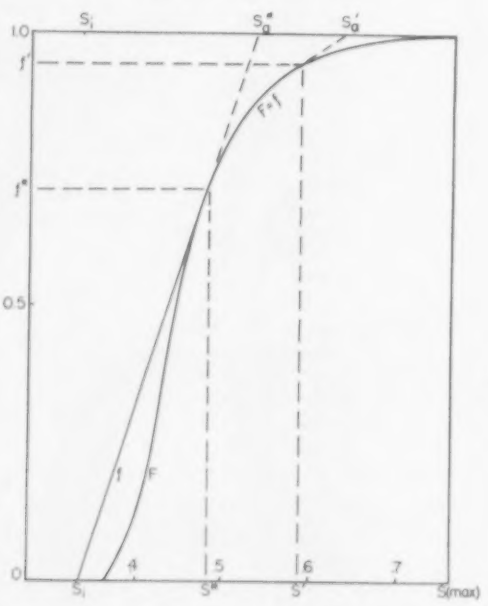
Now if there is a stabilized zone near the front, all saturations move with the same velocity in this zone (Fig. 1) and $(dx/dt)_S$ is constant. Since q_T is constant, then, by Equation 2, df/dS is constant for the range of S, so the plot of f is a straight line.

Author is associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

Fig. 2—(Right) Calculation of fractional flow in frontal and trailing zones, saturation at front, and average saturation behind a given saturation.

Fig. 1—(Below) Saturation distributions in stabilized frontal zone and in trailing zones at two different times.





Among the

Drilling Contractors

H. L. Rowley, Inc., Shreveport, is drilling for Sinclair Oil & Gas Co. at 1 Lynn, a new Lower Cretaceous test, in Santa Rosa County, northern Florida. Location is in 9-1n-27w, about 5 miles southeast of Milton.

Justiss-Mears Drilling Co., Jena, La., is under contract for an 8,500-ft. test to be drilled for Olin Oil & Gas Corp. at 1 Reale-Campisi, in 9-3n-4w, in southwestern Adams County, southwestern Mississippi. Location is near the Wilkinson County line.

Joe Beard is contractor on a 5,500-ft. wildcat test which Wherry & Green, of Houston, are starting in the active Charlotte area, of Atascosa County, Southwest Texas. Location is for 1 Lujan-Steinle, in the John Noble Survey, about a mile northeast of Charlotte.

A. W. Eggleston is drilling for F. A. Callery, Inc., of Houston, at a wildcat location 3 miles southeast of Alliance field, in western Plaquemines Parish, Coastal Louisiana. The test is designated as 1 Louisiana Citrus. Location is in 10-17s-25e. Contract is for 10,500 ft.

J. F. Crow Well Service Co., Brookhaven, Miss., has contracted for a test to be drilled on Oakley Dome, in Hinds County, Mississippi. It will be drilled for Sam D. Morrison and A. M. Keisker. The test, 1 Shuff, in 27-5n-3w, will seek production in Wilcox sand overlying the dome, and expected around 3,200 ft.

H. W. Pearson Drilling Co. is contractor on a new test being started in the Bean's Ferry area, Itawamba County, in northeastern Mississippi. Its contract is with Acadian Petroleum Corp. for 1 Gilmore-Puckett Lumber Co., located in 18-10s-9e, about ¾ mile southwest of an indicated gas-discovery well, J. F. Crow Well Service Co. 1 Summers, in upper Mississippian sand at 1,519 ft.

Sunnyland Contracting Co., Rayne, La., has been awarded contracts for two additional southern Mississippi wells, one to be drilled for Humble Oil & Refining Co. in Overton field, Adams County, and the other for Walter E. Sistrunk, of Jackson, in Chaparral field, Wayne County. The Humble job, at 1-B Blake et al., is a Wilcox test with projected depth of 6,700 ft. At Chaparral, Eutaw sands around 4,350 ft. will be tested.

Midwestern Drillers, Tulsa and Liberal, Kans., has a rig under contract to Ohio Oil Co. for a wildcat test 9½ miles northeast of Buffalo, in Harper County, northwestern Oklahoma. The test, 1 Yauk, in 27-28n-21w, is scheduled to go to the Arbuckle, expected around 7,450 ft.

Prince Drilling Co., Houston, has a new wildcat operation under way in Shelby County, eastern Texas. It is a contract job for H. J. Chavanne, trustee, at 1 Adams, in the Benjamin White Survey, 6½ miles northwest of Center. Hole is projected to 8,000 ft.

M & M Drilling Co. is under contract to the estate of William G. Helis for two more wells in Iberia field, Iberia Parish, Coastal Louisiana. They are 21 Schwing, in 56-12s-7e, and 5 A Bullock, in 25-12s-7e. Each is contracted to 6,000 ft.

G-M-R Drilling Co. is scheduled to drill another long-extension test for United Producing Co. in the Southeast Camrick area, on the Texas-Beaver County line, in the Oklahoma Panhandle. Its new contract is for 2 Harrison, in 30-2n-20eCM, a mile east of an indicated mile-north extension well now being tested by the same company. It will be the first test on the Beaver County side of the line.

Livermore Drilling Co., Lubbock, Tex., has taken contracts for two new Wolfcamp (lower Permian) tests to be drilled in the Townsend area, 6 miles west of Lovington, in Lea County, New Mexico. One will be for Simmons, Markam & Cone at 1 Schenck, in 11-16s-35e. The other will be for John J. Christman, at 5 Townsend, in 4-16s-35e. Contract depths are 10,700 ft. and 10,600 ft., respectively.

Field Drilling Co., San Antonio, has moved a rig to a wildcat location 6 miles northwest of Green, in Karnes County, South Texas, where it will drill another test for Lone Star Pro-

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ducing Co. Location is in the James Priest Survey, for 1 Edgar Esse. It is more than a mile north of a 5,500-ft. dry hole (1 Albert Esse), drilled for the same company. The new test is contracted to 6,500 ft.

Longhorn Drilling Corp., San Antonio and Three Rivers, Tex., has contracted to drill a deep wildcat test for The Texas Co. in San Patricio County, South Texas. The test is 1 F. Welder heirs, located 3 miles south of Edroy. Contract depth is 9,000 ft.

Gibson Drilling Co., Kilgore, Tex., has another 5,000-ft. Woodbine operation under way in West Jacksonville field, Cherokee County, East Texas, where it is drilling for L. A. Grelling. The new well is at 1 Howard et al, in Jose Pineda Survey. Location of the field is 5 miles west of Jacksonville.

Loffland Brothers Co., Tulsa, has the contract for a 9,200-ft. test Continental Oil Co. will drill in the Lake Arthur area, Jefferson Davis Parish, Coastal Louisiana. Location is for 1 Hughes, in 25-10s-4w.

Clyde Hall Drilling Co., Bakersfield, Calif., is to drill Union Oil Co.'s deep test scheduled for the Tejon Flats area, 20 miles southeast of Bakersfield, in Kern County, California. The test, 11-24 Reserve-Hay, in 24-11-19, is projected to the granite, expected around 8,000 ft. Location is several miles north of Tejon field proper.

R. H. Gracey, Houston, is starting another well for Union Oil Co. of California in the West White Lake area, southern Vermilion Parish, Coastal Louisiana. Newest operation is 15-B State Lease 540. Hole is to be carried to 12,650 ft.

R. C. Pearce, Worland, Wyo., is contractor on a test which Signal Petroleum Co. and others are undertaking in Nye County, Nevada. The new operation, in 27-12n-56e, is 20 miles northwest of Shell Oil Co.'s recently completed discovery well for the state. It is listed as 1 Halstead.

Parker Drilling Co. of Canada, Ltd., and Devon Drilling Co., Ltd., have been selected as contractors on two new wildcat tests which Texas Exploration Co. will drill in Central Alberta Province, Canada. Parker's job is 5-13 Arndt, in LSD 5, 13-48-24w4, 5 miles northeast of Millet. Devon will drill A-4-23, Louis Bull, in LSD 4, 23-45-25w4, on the Louis Bull Indian reservation, 6½ miles southwest of Wetaskiwin.

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REFINING

Expansion Near End

Husky winding up big modernization program

LLOYDMINSTER, Alta.—A one million dollar expansion and modernization program is nearing completion at the Husky Oil & Refining, Ltd., refinery here.

The project, which includes 2,500-bbl. a day addition to the crude distillation capacity, will boost the plant capacity to 10,000-bbl. per day.

In addition to the crude unit, the Cycloversion catalytic reforming unit is being expanded by 800-bbl. per day and desulfurization facilities for upgrading diesel fuels are being added.

The company is also building new asphalt building and packaging capacity.

Gulf Coast Refinery Closed

TEXAS CITY—The 18,000-bbl. per day refinery of Sid Richardson Refining Co. here was shut down last week for an indefinite period.

The shutdown apparently stems from poor marketing conditions. Any resumption would presumably be based on improved marketing conditions.

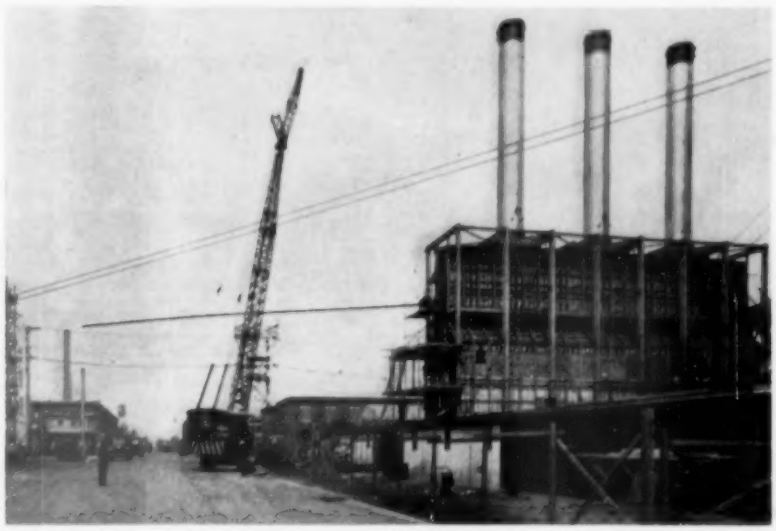
The refinery has been producing 87-octane gasoline. The capacity includes 9,000 bbl. daily of thermal operations and 4,000 bbl. daily catalytic reforming. The shutdown involves about 100 people.

The position of the independent refiner in the Gulf Coast area has been growing more difficult daily due to the dropping prices for refined gasoline. A market decline of ¼-cent per gallon on 87-octane gasoline was reported last week.

Catformer Work Progressing

LOS ANGELES.—Construction of a 600-bbl. Catformer at the Cut Bank, Mont., refinery of Union Oil Co., is progressing on schedule and it is expected to start operation by September. The catalytic reformer, costing $600,000, is being constructed by Ralph M. Parsons Co., Los Angeles.

Also under construction at Cut Bank is a 450-bbl. Unifiner. This unit will utilize excess hydrogen from the Catformer to remove sulfur and nitrogen compounds from a stove-oil stream.



Long Furnace Tubes Installed at Bayway

Installing these 85-ft. furnace tubes poses a special handling problem as Esso Standard Oil Co.'s new 60,000-bbl. per day crude unit nears completion at Bayway Refinery, Linden, N. J. A giant crane is shown supporting one of the 80 tubes installed in the atmospheric furnace of the three-stage crude unit. The 6 and 8-in. tubes are among the longest ever put into a crude furnace. The unit equipped with a prefractionator, will permit the retirement of older uneconomic capacity.

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Additional Tankage Planned

LOS ANGELES.—Union Oil Co. is planning the construction of 460,000 bbl. of additional tankage at the Los Angeles marine terminal serving its Wilmington refinery.

Plans also are being considered for the construction of an adidtional dock. The expansion is necessitated by the increased volume of products handled at the terminal, up 60 per cent during the past 5 years.

Petrochemicals

Writeoffs Given

ODM grants amortization for ten ammonia projects

WASHINGTON. — Ten companies have been granted certificates of rapid amortization for projects designed to add 506,000 tons per year of synthetic ammonia capacity. The Office of Defense Mobilization at the same time denied 11 applications amounting to nearly $102,650,000. The approved facilities will cost about $67,327,900.

The successful companies and proposed plants are listed below. Most of the new plants will base their synthesis operations on natural gas.

Company and location	Amount certified	P.cent al'wd
Alabama By-Products Corp., Tarrant, Ala.	$ 5,800,000	45
Allied Chemical & Dye Corp., Hopewell, Va.	7,800,000	45
Ammonia Chemical Corp. of Calif., Oleander Calif.	4,000,000	45
Atlas Powder Co., Atlas, Mo.	6,750,000	45
Columbia River Chemicals, Inc., Pasco, Wash.	10,251,000	45
Columbia-Southern Chem. Corp., Natrium, W. Va.	3,030,000	45
Dow Chemical Co., Texas Div., Freeport, Tex.	3,600,000	45
National Distillers Products Corp., Tuscola, Ill.	7,000,000	45
Shell Chemical Corp., Pittsburg, Calif.	371,900	45
Utah Chemical Co., Mt. Pleasant, Utah	18,725,000	45

Butadiene Unit Announced

WASHINGTON.—Union Carbide & Carbon Corp.'s Carbide & Carbon Chemicals Co. has been granted a certificate of necessity for a butadiene unit to be built at the company's new Seadrift, Tex., plant. The new addition will cost about $2,300,000.

The Seadrift plant, now under construction on the Gulf Coast between Houston and Corpus Christi, will initially produce ethylene oxide and polyethylene.

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Pipeline Patrol

. . . Report on Construction

Under Way, Contracted, and Planned . . .

PIPELINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipeline companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the job.

Crude-Oil Pipelines

Atlantic Pipe Line Co.—Moore Construction Co., building 40-mile, 8-in. loop of present line from Andrews to Midland, Tex. Job scheduled to finish in July.

• **California - Oregon Pipe Line System**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **Cities Service Pipe Line Co.**—60 miles, 12-in., Sour Lake, Tex., to Houston, Tex. O. R. Burden Const. Co. Completion set for July 15, 1954.

Interstate Oil Pipe Line Co.—River Construction Co. has contract to build 25 miles of 8 and 12-in. line from Little Lake oil field in Jefferson Parish, La., to Grand Isle on the Gulf of Mexico.

• **Magnolia Pipe Line Co.**—208-mile, 20-in. crude line under way from Corsicana to Magnolia's refinery at Beaumont, Tex. H. B. Zachry, Const.

• **NNCW Pipeline Co.**—127-mile line, proposed, from Weston County, Wyoming to Casper. 108 miles of 10-in. and 19 miles of 8-in. Est. Cost: $3,500,000.

• **Orchard Pipe Line Co.**—45-miles, 8-in., proposed to transport crude from Masters field in Logan County, Colorado, to point 4 miles northwest of Orchard. Estimated cost: $811,250.

• **Pawnee Pipe Line Co.**—35 miles of 10, 8, and 6-in. line approved from Adena field in Colorado to Merino, Colo.

• **Sinclair Pipe Line Co.**—20 miles, 12-16-in., planned, Monee to Blue Island, Ill. 16-in. completed. 14 miles of 12-in. awarded to Morrison Const. Co. Est. completion July.

Trans Mountain Oil Pipe Line Co.—Company has awarded contract to Engineers Limited Pipeline Co. to build 15 miles of 20-in. and 11 miles of 16-in. line. Both lines run from Sumas, B. C., to General Petroleum's refinery which is being built at Ferndale, Wash.

• **Union Oil Co. of California.**—Planning construction of a 60-mile crude line from its Clara Valley field to its Wilmington refinery. Line is expected to be completed by late this year. Size not yet determined. Engineering work under way.

• **West Coast Pipeline Co.**—960 miles, 24-26-in., planned. Wink, Tex., to Norwalk, Calif. $106,000,000.

Products Pipelines

American Pipe Line Co.—Has received ODM approval to amortize 40 per cent of $178,000,000 with a rapid writeoff on proposed line to run from Gulf Coast area to New York City area.

Badger Pipe Line Co.—195 miles, 10-12-in., July '54, East Chicago, Ind., to Madison, Wis. (Joint project of Cities Service Oil Co., Sinclair Pipe Line Co., Pure Oil Co., and The Texas C.).

• **H. W. Bass & Sons, Inc.**—152 miles, 4-6-in., proposed. Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

Great Lakes Pipe Line Co.—Under way extension 130 miles, 8-in., Nebraska City to Grand Island, Neb. R. H. Fulton Const. Co.

127 miles, 8-in., to run from Iowa City, Iowa, to Prophetstown, Ill., and to tie in to the Badger system there. M. R. Co. and Mid-States Construct. Co.

• 188 miles of 12-in. to run from Kansas City to Des Moines. Midwestern Constructors, 48 miles R. H. Fulton & Co., 71 miles, and M. R. Co., 69 miles.

• 98 miles of 12-in. from Rosemount to Willmar, Minn.

• 63 miles of 12-in. from Willmar to Alexandria, Minn.

105 miles of 8-in. from Alexandria to Fargo, N. D. R. H. Fulton & Co.

Harbor Products System.—86 miles of 16-in. underway from Woodbury Junction to Tremley Point, N. J. Pipeline Construction & Drilling Co. is doing the work and completion is not definite because of right-of-way difficulties.

• **International Pipe Line, Inc.**—132 miles, 8-in., proposed, Wrenshall to Minneapolis, Minn.

Phillips Pipe Line Co.—71 miles of 8-in. now out for bids. Company expects line to be completed in September.

Shell Pipe Line Corp.—65 miles of 12-in. products line from Baton Rouge, La., to Shell's Norco refinery. Houston Contracting Co. has contract. H. T. Muckley, Supt.

• **Sunflower Pipe Line System.**—Company proposes to build a 215-mile, 6-in. line to transport LPG from six counties in western Kansas to Wichita. Kansas Corporation Commission will hear application on July 19 and 20.

U. S. Gov't. Alaskan Products Pipe Line.—600 miles, 8-in., under way, Haines northward through British Columbia and Yukon to Fairbanks, Alaska. Williams Bros., McLaughlin, Inc., and Marwell Const. Co. Completion date 9-55.

Wyoming-Nebraska Pipeline Co.—Houston Contracting Co. has general contract to build 220 miles of 6-in. line from Frontier Oil Co.'s refinery at Cheyenne to North Platte, Nebraska. Work expected to be completed by October 1954.

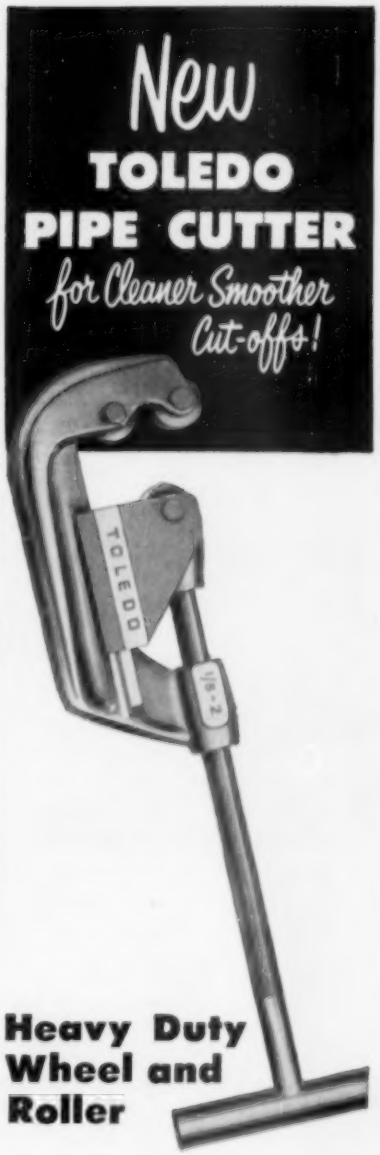
Yellowstone Pipe Line Co.—(Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co., and H. Earl Clack interest) 531 miles, 10-in., under way, Billings, Mont., to Spokane, Wash. 9-54. Est. cost: $20,500,000.

Billings to Bozeman, Mont. Ross and Powers, Comp. 133 miles, 8-31-54.

Bozeman to Helena and on to Clinton, Mont. Associated Pipe Line Contractors, Inc. Completed. 94 miles 6-15-54.

Helena to Clinton Mont. Associated Pipe Line Contractors, Inc. 69 miles 8-31-54.

Clinton to Perma, Mont. Eastern Pipe Line Fields Service Co. 76 miles. Completed.



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Pipeline Patrol

Perma, Mont., to Murray, Idaho. Eastern Pipe Line Field Service Co. 74 miles 7-1-54.

Murray, Idaho to Spokane, Wash. Engrs. Limited Pipe Line Co. 85 miles 7-1-54.

Natural-Gas Pipelines

• **American-Louisiana Pipe Line Co.**—1,121 miles of 30 and 22-in., 30-in., proposed, extends from North Tepetate, Acadia Parish, Louisiana, to near Detroit. The 22-in. starts near Payne, Ohio, extends to Bridgman, Mich. Estimated cost: $130,000,000.

• **Arkansas Louisiana Gas Co.**—108 miles of new line proposed, to be added to present system in Arkansas, Louisiana, and Texas. Estimated cost: $9,245,166.

• **Atlantic Seaboard and Virginia Gas Transmission.**—116 miles, 26-in., proposed, loops along Cobb, W. Va., to near Baltimore, Md. Started May 1.

• **Carolina Natural Gas Corp.—185 miles**, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Central Hudson Gas & Electric Corp.**—Company has filed application with FPC to construct 48 miles of 12-in. line from Albany to Kingston, N. Y. Line will be started and completed in 1955 if FPC approves.

Chicago District Pipe Line Co.—19 miles of 36 and 30-in., completed of 35 miles planned. Remainder, all 30-in., will be completed in 1954.

• **Cities Service Gas Co.**—24 miles of 26-in. proposed, to replace two existing 16-in. lines in Franklin and Johnson counties, Kansas.

Nine miles of 20-in. to replace existing 16-in. line in Cherokee and Jasper counties, Missouri.

• **City of Dalton, Ga.**—Proposes to build 39 miles of 8-in. from a point of interconnection with Southern Natural's Rome-Calhoun transmission line. Estimated cost: $2,940,000.

• **City of Fayette, Ala.**—20 miles, 5-in., FPC approved, Fayette, Ala., to Southern Natural's system in Tuscaloosa County, Alabama. Completion set for early 1955.

City of Dallas, Ga.—56 miles of 8 and 4½-in., distribution system. Engineering & Const. Co. Completion June 1954.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.—365 miles**, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954.

49 miles, 20-in., under way, Morton County, Kansas, to near Hooker, Okla. Estimated cost: $3,999,000. R. H. Fulton Const. Co.

• **Colorado-Western Pipe Line Co.**—454 miles of undetermined size pipe planned between Cortez in Montezuma County and Denver. Line would serve towns of Montrose, Gunnison, Salida, Fairplay and South Platte, Colo. Estimated cost: $30,000,000. Company also plans 254 miles of laterals to service Colorado cities not now receiving natural gas.

328-mile line, proposed, to run from a point in La Plata County in southwestern Colorado over the Continental Divide along the eastern slope to serve Pueblo, Colorado Springs, and Denver. Estimated cost: $21,600,000.

• **Dixie Pipe Line Co.**—Proposed 20-mile, 8-in., line from Gwinville field to connection with Transcontinental Gas Pipe Line Corp.'s existing transmission line in Jefferson Davis County, Mississippi. Est. cost: $425,000.

• **Fort Worth Basin Gas Co.**—Planned, Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

Pipeline Patrol

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., under way. Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting. 11-54.

Houston Contracting Co., Ltd., has completed 370 miles of its 500-mile contract from Rayne, La., to Kinkade, Tenn. Three spreads which have been working on the job are presently overhauling equipment and will not resume work until spring. Spread 1, headed by E. C. Norris, has completed 165 miles from the Mississippi River northward and it will resume work this spring.

Spread 2, headed by F. A. Silar, has completed 117 miles from the Ouachita River southward into the inception point of Rayne.

Spread 3, headed by M. L. Thompson, has completed 88 miles from the Ouachita River northward to the Mississippi River. It will begin work in the spring at the terminus of Kinkade, going south to join with Spread 1.

The remaining 346 miles is under contract to H. C. Price Co., Bartlesville, Okla. The firm has completed 276 miles and has 70 miles remaining which will be started in the spring. Three spreads, headed by G. A. Reutzel, R. L. Ezell, and W. H. Olrich, have done the work. Price's contract covered the line between Gordonsburg, Tenn., and Catlettsburg, Ky.

Under way, Rayne, La., to Kincade, Tenn. Houston Contr. 370 miles laid. 130 miles left to be finished Spring of 1954.

Under way, Gordonsburg, Tenn., to Catlettsburg, Ky. 266 miles completed, 91 miles left.

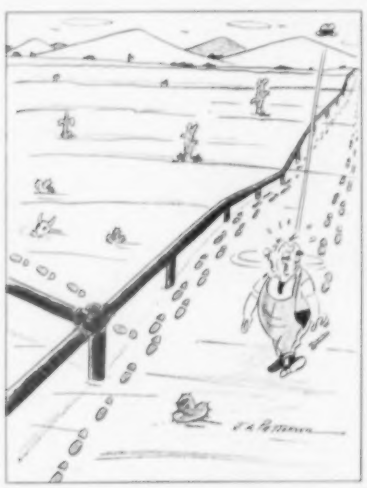
230 miles, gathering lines, under way. Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—Asking for bids on 24 miles of 12-in. from Halsey Valley to Westover, N. Y.

Also asking for bids on 25 miles of 12-in. from Port Dickinson to Deposit, N. Y.

• **Hope Natural Gas Co.**—Proposing to build a 22½-mile extension of existing line from Boone County, West Virginia, to Logan-Mingo County Line, W. Va. Est. Cost: $930,000.



• **Houston Texas Gas & Oil Co.**—Company proposes to build two natural gas lines. One line would run from lower Rio Grande Valley to Chicago. The other line would go from southern Louisiana to New York City. Engineering firm reported preparing an economic report on the lines at present.

Iroquois Gas Corp. and Tennessee Gas Transmission Co.—Companies planning joint storage project to be known as Colden storage field in New York. The following delivery and gathering lines are planned:

17 miles, 16-in. delivery line.

62 miles, 12, 8, 6, and 4-in. gathering lines.

• **Iroquois Gas Corp.**—25 miles of 20-in. line, approved by FPC, from Iroquois' Porterville station near Elma, N. Y., to Tonawanda, N. Y. Est. cost: $1,540,000.

Kansas-Nebraska Natural Gas Co., Inc.—Proposes to construct 206 miles of 6-12-in. pipeline to add to present system in central and northeastern Nebraska.

• **Lateral Gas Pipe Line Co.—27 miles, 4½ in., proposed, from Grant to Clarinda, Ia. Estimated cost: $267,200.**

• **Manufacturers Gas Light & Heat Co.—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.**

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., proposed, Doddridge, Wetzel and Marshall counties, West Virginia.

• **Michigan Consolidated Gas Co.—25 miles, 12-in., proposed, from near Sparta to Muskegon, Mich.**

• **Michigan Wisconsin Pipe Line Co.—251 miles, proposed, 24, 18, 12, 6, and 4-in. loops. Majority will be in Wisconsin.**

Missouri Central Gas Co.—25 miles, 6-in., proposed, Moberly to Macon, Mo.

• **Missouri Public Service Co.—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.**

24 miles, 10-in., Johnson County to Clinton, Mo. FPC approved. Est. cost: $600,000.

• **Montana-Dakota Utilities Co.**—Proposes to build 56 miles of 2, 4, and 6-in. line from its 12-in. Cabin Creek-Bismarck line near Gladstone, N. D., to the towns of Lefor, Regent, New England, and Mott, N. D.

• Proposed 34½ miles of 12¾-in. line to run from Baker-Glendive field in Montana to Rapid City, S. D., and 14 miles of 12¾-in. to replace various lines in Park County, Wyoming, and Carbon County, Montana.

• **Natural Gas Producer, Inc.—100 miles, 12-in., planned, Yenter pool to Denver, Colo.**

• **New River Gas Co.—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.**

• **North Dakota Gas Transmission Co.—470-mile line from Tioga plant of Signal Oil & Gas Co. and Beaver Lodge field to Fargo and Grand Forks, N. D. Line will have 78 miles of 12-in., 215 miles of 10-in., 70 miles of 8-in., and 107 miles of 6-in. Estimated cost: $10,800,000.**

• **Northern Indiana Fuel & Light Co.—15 miles, 8-in., planned, Edgerton to Auburn, Ind.**

Northern Natural Gas Co.—Midwestern Constructors, Inc., has two jobs for company. No. 1 is 94 miles of 30-in. pipeline consisting of five loops (one in Texas, one in Oklahoma, and three in Kansas). 20 per cent completed as of May 20. No. 2 is 95 miles of 30-in. pipeline consisting of six loops (one in Kansas, one in Nebraska, three in Iowa, and one in Minnesota). 5 per cent completed as of May 20.

93½ miles of 20-in. from Ogden to Waterloo, Iowa; work being done by the Hallmac Construction Co. of Houston.

90 miles of 16-in. from Waterloo to Dubuque, Iowa; work being done by Engineering Construction Co. of Tulsa.

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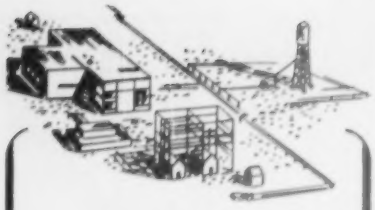

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16 and 10-in. branch from Newton to Grinnel, Iowa; work being done by G. G. Griffis Construction Co. of Tulsa.

24 and 26-in. lines south of Paullina, Iowa, and 20 and 24-in. lines from Paullina to Sioux Falls, Iowa; work being done by R. H. Fulton of Lubbock.

Two underwater crossings totaling 5,100 ft. being done by Lone Star Constructors of Dallas.

• 167 miles of 24-in. line proposed to run from Farmington, Minn., to Duluth. Est. cost: $12,195,300.

• **Northwest Alabama Gas District**—40 miles, 9-in., proposed, Southern Natural's line through Windfield to Haleyville, Ala.

Northwest Natural Gas Co.—665 miles of unannounced size pipe to bring gas from Alberta, Canada, to the "Inland Empire" of northern Idaho and eastern Washington. Estimated cost: $36,000,000.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

69 miles, 20-24-in., proposed, lines to tiein Gulf Interstate line along various points in Lawrence, Jackson, Vinton, Hocking and Fairfield counties, Ohio.

• 24½ miles of 20-in. line in Richland and Crawford counties, Ohio.

Pacific Gas & Electric Co.—200 miles, 34-in., planned, paralleling Topock-Milpitas line. 93 miles completed. 107 miles contracted to Engineers Limited Pipe Line Co. L. E. Robertson is in charge of the spread handling work from Newberry to Danby and from Los Muertos Creek to Gilroy, Calif. Completion November 1954.

15 miles, 20-in., planned for completion in 1955 from Helm Tap to Helm Junction, Calif. Alex Robertson Co.

15 miles, 12-in., planned for completion in 1955. From Herndon to Madera, Calif. Company forces.

13 miles, 16-in., scheduled for completion in 1954. From Fairfield to Napa Wye, Calif. M.G.M. Construction Co.

30 miles, 10-in., scheduled for completion in 1954. From Corning field to Chico, Calif. Company forces.

19 miles, 16-in., from Wild Goose field to Yuba City, Calif. Scheduled for 1954 completion by company forces.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash. Approved by F.P.C.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

• **Pine Tree Natural Gas Co.**—204 miles of undetermined size pipe to run from the Boston area to Bangor, Me.

• **Shenandoah Gas Co.**—40 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va. Est. cost: $1,470,000. FPC approved.

• **South Georgia Natural Gas Co.**—368 miles, 2-12-in., planned, Phoenix, Alta., to

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Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee. Est. Cost: $9,000,000.

Signal Oil & Gas Co.—Groninger & King are laying approximately 100 miles of gathering lines for this company's Fox gasoline plant in Carter County, Oklahoma.

• **Southeast Alabama Gas District.**—150 miles, 10 and 8-in., planned, Phoenix City to Dothan, Ala. Engineering Const. Co. Start summer 1954.

Tennessee Gas Transmission Co.—Company has awarded following contracts on 566.8 miles of 30-in. line from Kinder, La., to Portland, Tenn.

98.7 miles from Kiner to U. S. Highway 84 near Jena, La., to Morrison Constructors, Inc.

90.2 miles from U. S. Highway 84 to Louisiana side of Mississippi River to Anderson Brothers Corp.

105 miles from Mississippi River to U. S. Highway 51 near Grenada, Miss., to Houston Contracting Co.

101.6 miles from Grenada to U. S. Highway 45 near Corinth, Miss., to Oklahoma Pipe Line Constructors.

94.9 miles from U. S. Highway 45 to near Centerville, Tenn., to Western Pipe Line Constructors, Inc.

75.6 miles from Centerville to near Portland, Tenn., to Panama-Williams Co.

63 miles, 26-in., planned, loops in Ohio and Pennsylvania.

45 miles, 20-in., proposed, Buffalo, N. Y., to the U.S.-Canadian border near St. Catherines.

243 miles 24-in., planned, Coudersport, Pa., eastward across Pennsylvania, New Jersey, and New York to point near Greenwich, Conn.

• **Texas Eastern Transmission Corp.**—Proposed, 225-mile, 30-in. line from Castor, La., to Kosciusko, Miss., to connect with its existing 30-in. line there to Connellsville and replace the "Little Inch" in moving natural gas.

• **Texas Eastern Penn-Jersey Transmission** Corp.—265 miles, 24-in., approved by the FPC from Oakford Storage field in western Pennsylvania to Texas Eastern Transmission Corp.'s Compressor Station No. 26 near Lambertville, N. J. Est. cost: $30,755,000. 54 miles let to H. C. Price Co. C. E. Shivel, superintendent.

• **Texas Gas Transmission Corp.**—48 miles, 26-in., planned, loops from Memphis to Slaughters, Ky.

24 miles, 16-in. line planned from North Tepetate field, Acadia Parish, Louisiana, to South Roanoke field in Jefferson Davis Parish, Louisiana. Work to be done in September and October.

• **Transcontinental Gas Pipe Line Corp.**—421 miles, 30-36-in., looping along Texas-New York line.

19 miles of 12.75-in. pipe starting at West White Lake field in Vermilion Parish, Louisiana, and connecting with applicant's transmission line in same parish. Estimated cost: $1,042,310. FPC approval received.

• 57 miles of 36 and 30-in. paralleling sections of its existing system in Louisiana, Mississippi, and Alabama. Approved by FPC. Est. cost: $6,533,000.

• 25 miles of 12-in. in Cameron and Calcasieu parishes, Louisiana, to additional gas reserves. Est. cost: $1,000,000.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **Trunkline Gas Co.**—Proposes to cross the Mississippi River with two 24-in. lines near Greenville, Miss. Est. cost: $2,960,000.

• **United Fuel Gas Co.**—52 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

57 miles, 30-in., under way, Lanham in Kanawha County, West Virginia, to Gulf Interstate line in Boyd County, Kentucky. Spring '54. C. R. Ice, spreadman.

Utah Natural Gas Co.—Planning 40 miles from Orem to Salt Lake City, 16-in. pipe at later date. Contract not let yet.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Foreign Crude-Oil Pipelines

• **Atlas-Dresser.**—Included in this company's agreement with the Argentine Government are plans to built a 400-mile, 16-in. crude line from Plaza Huincul area to Bahia Blanca.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., contractors. (Crude and Products). Collins Const. Co. has subbed 84,000 ft. of Subaqueous work. Shutdown for Monsoon season. Work will resume September 15.

Creole Petroleum Corp.—21 miles, 34-in. crude line to run from Lagunillas field to La Salina, Venezuela. Williams Brothers Overseas Co. has contract with construction slated to start in February and to be completed in 6 months. Line when completed will be the world's largest-diameter crude line.

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

• **Gaz de France**—200 miles, 12-in. Ruhr to Paris, France.

Interprovincial Pipe Line Co. and Lakehead Pipe Line Co.—Contracts have been awarded for 604 miles of looping; 454 miles will be in Canada, the remaining 150 miles will be in the United States.

201 miles of 24-in. between Regina and Gretna, Man., have been awarded to Anderson International Contractors, Ltd., of Edmonton, Alta.

Mannix, Ltd., of Calgary, Alta., will lay 129 miles of 24-in. line between Edmonton and the Alberta-Saskatchewan boundary.

Fulton-Bannister, Ltd., has contract for 125 miles of 24-in. line to connect the lines being built by Anderson and Mannix.

R. H. Fulton & Co., of Lubbock, Tex., has the contract for 104 miles of 26-in. looping from the Canadian border southeast. Anderson Bros. Corp. has contract for 50 miles of 26-in.

• **Mid-Saskatchewan Pipelines, Ltd.**—Proposed line from Smiley Viking oil field to connect with Interprovincial Pipe Line Co.'s Kerrobert pump station.

• **Pembina Pipe Line Co., Ltd.**—Company has permit to build 325 miles of 3-12-in. gathering line from Pembina field and a 72-mile, 16-in. transmission line to the terminals of Trans Mountain Pipe Line Co. and Interprovincial Pipe Line Co. at Edmonton, Alta.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Ishthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pta. Nino de La Dorada.

Texas Petroleum Co.—Contract has been let to Foster Wheeler Corp. and Panama-Williams for a 119-mile 12-in. crude line to

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HIGH VOLTAGE—HIGH CURRENT

CONTROL—Magnetic Amplifier.

OUTPUT: 6 to 500 VDC at 5 to 200 Amps. continuous.

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PIPE LINE SURVEYS

Pipeline Patrol

move oil from Velasquez field in Colombia to a connection with the main Andian National system at Galan. Est. cost: $6,000,000.

• **Yacimientos Petrolliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipelines

Anglo-Iranian Oil Co., Ltd.—18½ miles, 16-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

18½ miles, 6-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

15 miles, 12-in., under way, Kwinana to Fremantle, M. W. Kellogg Co. Completion date February 1955.

17 miles, 6-in., Kwinana to Fremantle. M. W. Kellogg Co. Completion date February 1955.

• **Empresa Nacional del Petroleo** — 80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

North Atlantic Treaty Organization (NATO)—1,920 miles, 4-10-in., to serve military bases in Western Europe (to connect with U. S. Government's St. Nazaire-Paris-Metz line.) Contracted by Soc. Foster Wheeler Francaise.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

• **United States Navy Department.**—Proposed 300-500-mile line to be built in Spain to serve a proposed naval base and four large air bases which are also proposed under a defense agreement with the Spanish Government. No definite size or cost is known now.

Foreign Natural-Gas Pipelines

Azienda Generale Italiana Petroli — 90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

• **Burma Oil Co., Ltd.**—350-mile, 16-in. line planned from Sui field to Karachi in West Pakistan. Estimated cost: $25,000,000. Morrison-Knudson Const. Co. doing work.

Direccion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo** — 80 miles, 10-in., planned, Concon to Santiago, Chile.

Petroleos Mexicanos. — 205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

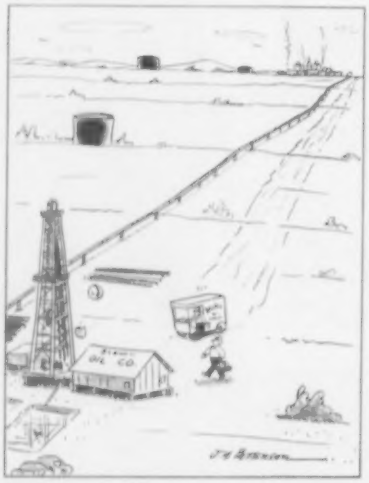
• **Trans-Canada Pipe Lines, Ltd., (Canadian Delhi Oil Co.)**—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in., gathering system in Alberta.

• **Union Gas Co. of Canada, Ltd.**—Proposed line from Lambton County gas-storage fields to Oakville. Line is being proposed now and will eventually join with proposed line from Alberta to Toronto and Montreal.

• **U. S. Navy**—Proposes to build gas line from Gubik gas field near Navy Petroleum Reserve No. 4 in Alaska to Fairbanks. Line would be 450-mile, 8-in. line and Arctic Contractor, Inc., who handled engineering requirements and preliminary design estimated the line would cost $20,000,000, although later figures have been much higher than this.

• **Western Pipe Lines, Ltd.**—Will build 80-mile, 20-in. line from Niagara Falls, N. Y. to Toronto. Gas will be furnished by Tennessee Gas Transmission and taken over in Toronto by Consumers Gas Co. Est. cost: $7,000,000. Canadian Bechtel, Ltd., doing engineering work.



"Two quarts here—and incidentally this is one of the toughest deliveries on the route."

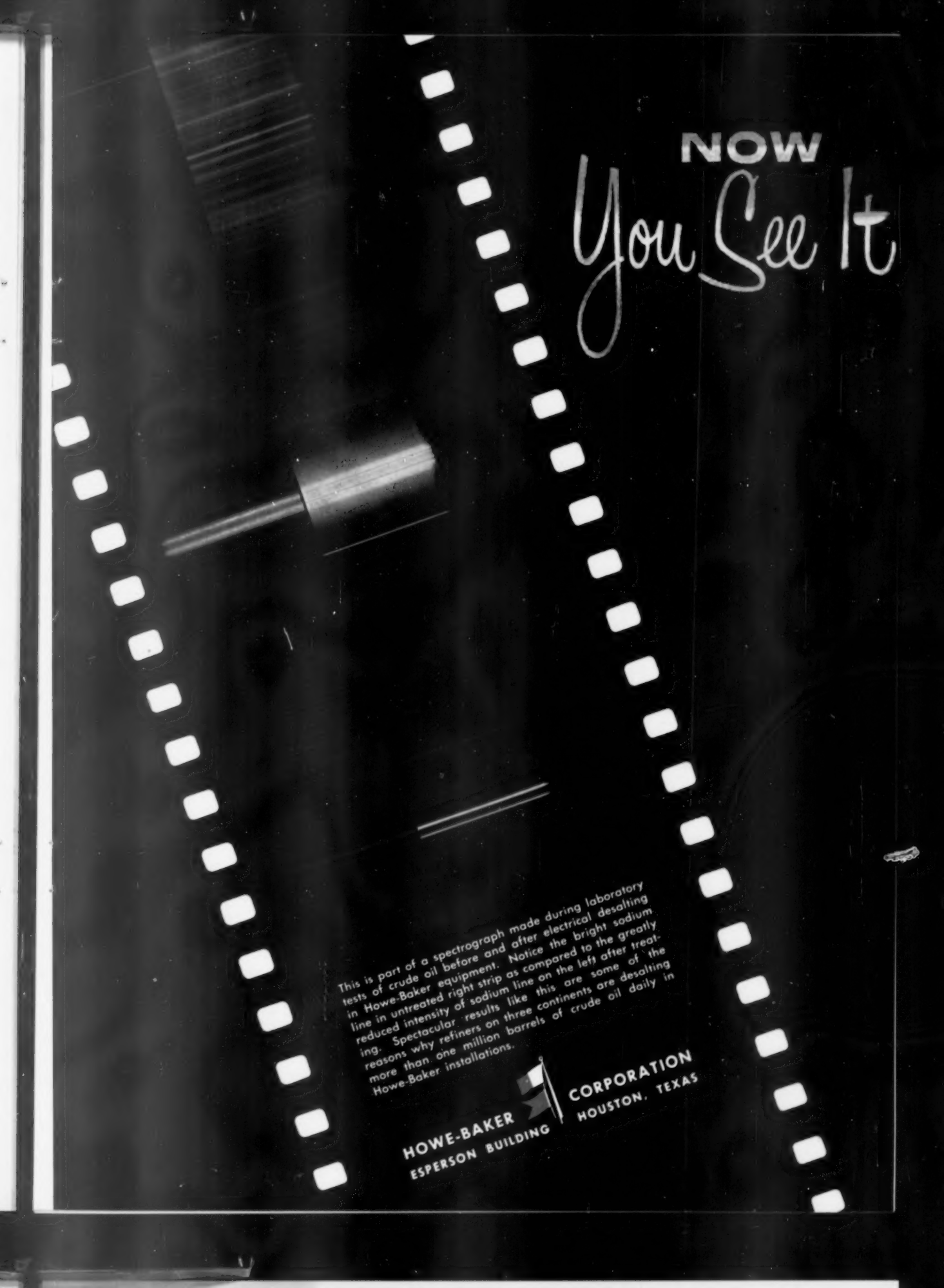
BOOKS

SELECTED AND ANNOTATED BIBLIOGRAPHY OF NATURAL GAS. By Richard C. Henshaw, Jr. Published by Bureau of Business Research, University of Texas, Austin. 61 pp., $1.50.

Students of natural-gas economics will find in this book a complete bibliography of books and articles related to Texas natural-gas economics. Studied and used as the basis of the 1952 book, The Economics of Natural Gas in Texas, much of the material included in this bibliography was too lengthy to be included in the 1952 book, and so it is grouped here as a complete unit for the first time. In addition, the author has added numerous books and articles that have appeared since 1952 and which relate new phases of natural-gas economics.

THE FINANCIAL POST SURVEY OF OILS, 1954 Edition. Prepared by the staff of the Financial Post. Published by Maclean-Hunter Publishing Co., 481 University Avenue, Toronto 2, Ont., Canada. 364 pp., $3.

This book is a complete listing of all major oil and gas companies operating in Canada—their officers, history, properties, and operations. It also presents comprehensive statistics on Canadian oil and gas production and reserves; a 5-year price range of oil-stock movements; maps of important oil fields including newly developed areas; and a list of inactive and defunct companies. Comprehensive and authoritative, this survey is a standard reference book for investors in the Canadian oil industry.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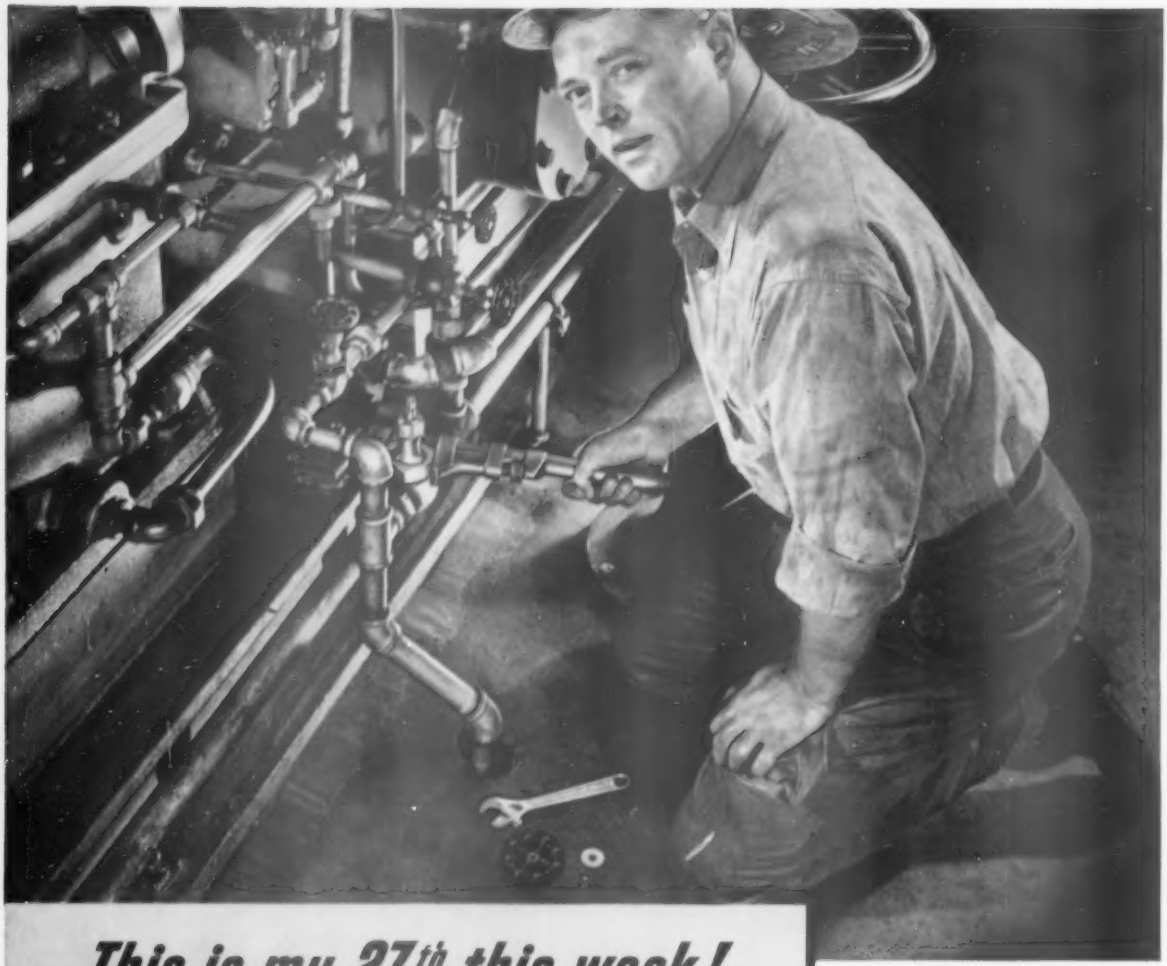

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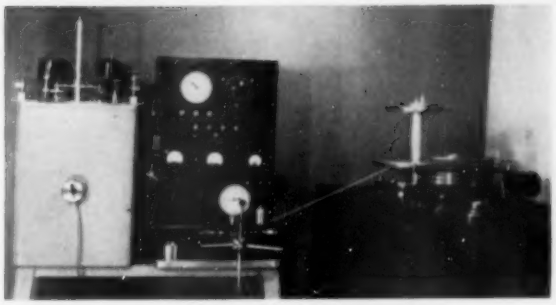
. . . What's New in Equipment?

Use the handy Time-Saver Cards ✓✓✓ to obtain additional information on these items

by Dan B. Miller



Supercompressibility Unit Developed

A new supercompressibility apparatus has been developed for determining the deviation of a gas behavior from Boyle's law. This instrument is of importance to all who are interested in the accurate metering of large volumes of gas.

The instrument is based on the original Burnett apparatus, but is completely redesigned and rearranged to increase its accuracy and improve its performance. It consists of two interconnected high-pressure chambers of known volume ratio. The gas to be tested is expanded from the first chamber to the evacuated second chamber, the drop in pressure being determined while a constant temperature is being maintained. The characteristics of the gas are determined at temperatures constant to ±0.005°C. Pressure variations as small as ±0.01 psi. at pressures in excess of 2,000 psi. can be determined.

The expansion cell is made of stainless steel and has two cavities of approximately 50 and 24 cu. in. An insertable stainless steel plug with a volume of 11.5 cu. in. is furnished to reduce the volume of the smaller chamber. The closure of the larger chamber forms a part of the housing of a double-contact diaphragm differential-pressure indicator, which thus becomes a part of the cell assembly.

The constant temperature bath consists of a steel tank heavily insulated with compressed glass-wool and covered with plastic lids. Two vertical side ducts with stirring or circulating motors are provided, one containing an electric heating unit and the other cooling coils. *Ruska Instrument Corp.*

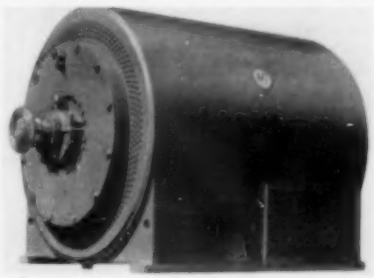
Check No. 1 On The Time Saver Card

●

1,250-Hp. Motor Gets Underwriters' Approval

Extension of the A-C motor line has been announced with the approval by Underwriters' Laboratories, Inc., of a 1,250-hp., 2,300-volt, 1,780-r.p.m. explosionproof motor (Type ANZZ).

As a result of this approval, motors of this size and equivalent frames in other ratings will carry the Underwriters' label for operation in Class I, Group D hazardous locations. The Underwriters' approval extends to all motors of a similar construction in which the internal free volume and physical dimensions do not exceed that of the motor tested.



The A-C explosionproof design is a modification of the company's totally enclosed, fancooled motor line with tube-type air-to-air heat exchangers. It meets the requirements of industries in which explosionproof drives must be specified. *Allis-Chalmers Manufacturing Co.*

Check No. 2 On The Time Saver Card

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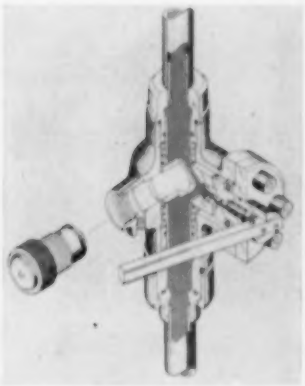

New Valve Permits Injection Without Flow Interruption

A new soluble plug injector is for use as part of the hydraulic system of pumping oil wells. The new injector permits the insertion of soluble plugs into high-pressure oil lines without interrupting oil flow.

The new injector is applicable for injecting plugs in surface-power oil lines at the central-power control station. It is also used under the four-way valve of the parallel-type hydraulic Free-Pump system for running soluble plugs down the production tubing. The injector is available in 1 and 1¼-in. sizes, and is designed for 5,000 psi. w.p.

Within the cast-steel body is a plug which is square in cross section. Through this square plug is a large diameter hole which serves as the loading chamber for the soluble plug. In the operating position, the square plug is oriented so the large hole is in line with flow going through the injector. The square plug itself is held between

two spring-loaded shoes which serve to direct flow through the hole. When the square plug is turned 90°, to load position, by external operating handle, there is a fluid channel through another hole drilled in the square plug to bypass the loading chamber.

Bumping a bleeder valve in the loading cap relieves the line pressure within the loading chamber and the cap can be removed. At this time the line fluid flows through the bypass channel. As soon as the soluble plug is inserted in the loading chamber and the cap replaced, the operating handle is turned back to "operate" position. This puts the soluble plug into the flow stream which forces it down the line. Flow through the injector is continuous throughout the operation. *Kobe, Inc.*

Check No. 3 On The Time Saver Card

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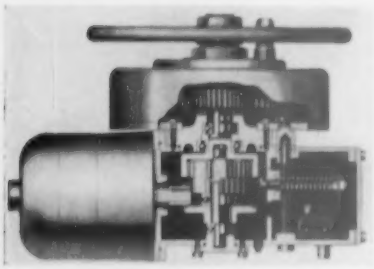


Valve Operator Covers Wide Range of Conditions

The function of the Series A Tork-Master operating unit is to operate, by electrical control, all types of conventional gate, globe, plug, butterfly, and other kinds of valves in sizes from 2½-in. upwards. The basic design provides for almost unlimited variations in operating speeds, torque, and length of travel to accommodate a wide range of valve designs and operating conditions. Installation requires no alterations in the valve itself and can be made on valves in use without removing them from the line.

Major advantages claimed for the Tork-Master include savings in labor; greater safety, particularly in emergencies; and more freedom in designing piping installations due to the elimination of any need for scaffolding or cat walks for access to remotely located valves for manual operation. High efficiency design requires less motor power to crack the valve in the opening cycle. In the closing cycle, power is cut off at the precise moment that proper seating has been attained. Stem thrust can be regulated to almost any predetermined valve in either direction.

Series A Tork-Master operating units are manufactured in three basic models, Model AD, Model AF, and Model AG, with ¼ to 3-hp. electric motors. *Harvill Corp.*

Check No. 4 On The Time Saver Card

●

Elevator Links Offered With Small Upper Eye

New elevator links are offered with a small upper eye. Not only are these links forged from a single billet of high-quality alloy steel, with no welding, but a vertical furnace and quench tank are used for heat treatment to reduce the hazards of bending or warping.

The junctures of the top and bottom eyes with the shank have been developed to keep unit stresses within safe limits, and adequate steel in the top of the upper eye avoids bending under load. These new links are available in sizes from 1¾ to 2¾ in. with lengths from 36 to 132 in. The massive 2¾ by 132-in. links are especially designed for the heaviest loads encountered in the deepest wells. *Web Wilson Oil Tools, Inc.*

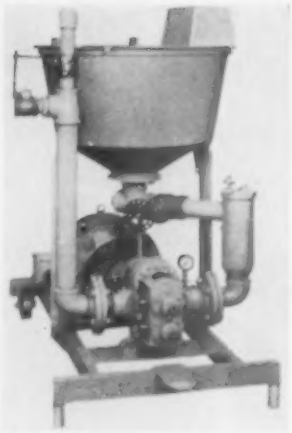
Check No. 5 On The Time Saver Card

●

Grease Deaerator Handles Up to 8,000 Lb. Per Hour

A new portable grease deaerator, designed to be used with the Morehouse grease mills, will deaerate up to 8,000 lb. per hour. The new deaerator, designated Model F, stands 49 in. high and is equipped with wheels so that it may be quickly and easily moved from mill to mill as needed. It is powered by a 7½-hp. motor, either open dripproof or explosionproof.

Some greases are aerated even during the kettle cooking process to a point where entrained air becomes a serious problem. From the economic standpoint, a drum will hold more grease, by weight, if the product has been deaerated. Net weight increases of from 20 to 40 lb. per drum are not unusual. *Morehouse Industries.*



Check No. 6 On The Time Saver Card

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Infrared Analyzer Made For Push-Button Analyses

Push-button automation of complex chemical analyses can be accomplished with the aid of a new automatic multicomponent infrared analyzer. The new instrument automatically analyzes up to 10 components in a sample in 10 minutes. Results are presented instantly on an electric typewriter, or a counter, or punch-card device. Instrument time is shortened by nearly 50 per cent over usual manual spectrometer analyses.

The instrument was developed in conjunction with Ethyl Corp. It will be used primarily by petroleum and petrochemical companies. Since the analytical data is presented in a form ready for automatic computing, the operator has little to do except push a button.

The new instrument consists of a standard single-beam infrared spectrometer. It is attached to a control unit which sequences through 10 prede-

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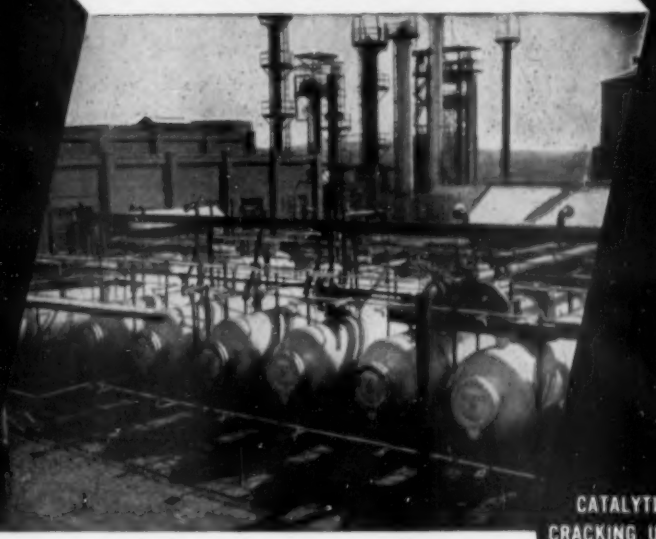

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Many installations of ENGINEERED "Automatic" FIRE PROTECTION have been made in refinery and petro chemical properties throughout the Western Hemisphere and the record speaks for itself: "Complete control of fire within protected areas — in seconds!"

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Write or call us today for an appointment with a "Safety First" future.

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termined analytical wavelengths. These selected wavelengths depend upon the components to be analyzed. The sample cell is automatically shifted into and out of the infrared beam, to give quantitative readings. *The Perkin-Elmer Corp.*

Check No. 7 On The Time Saver Card

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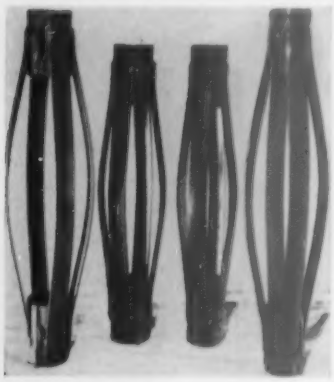


Latch-On Centralizer Uses Stronger Hinges

A stronger-hinged tubing centralizer has been designed for centering 2⅜ or 2⅞-in. external upset tubing in 5½, 7-in., or larger A.P.I. casing sizes.

The Latch-On centralizer is mounted over a welded stop-collar or over the tubing coupling for usage above packers, in dual-zone completions, with gas-lift flow valves, or in cementing.

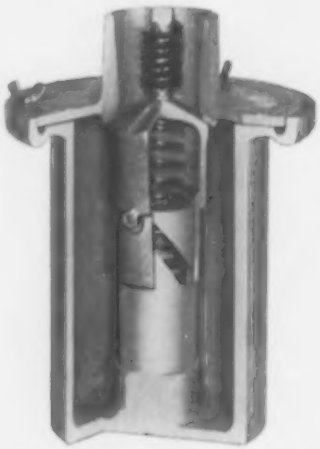
The Kon-Kave bows of the centralizers reduce the friction in running tubing and the heat-treated spring-steel bows protect the tubing couplings against wear in pumping, and flowing wells. *B and W Inc.*

Check No. 8 On The Time Saver Card

●

Sucker Rod Joint Failures Reduced by New Box Cleaner

The Little Squirt sucker rod box cleaner is a new device to clean the coupling threads when rods are being run or removed from the well. With the rod suspended in the derrick or mast, the cleaner is raised and lowered several times under the rod. At the same time the nozzle with attached nylon bristles is guided into the coupling. The weight of the rod depresses the piston, causing cleaning fluid to jet with considerable force from the discharge ports in the nozzle.



At the same time, the piston, with attached brush-nozzle, whirls, producing a combination brushing and flushing action.

The complete unit weighs 10 lb. and is made of aluminum with light brass piston and nozzle. Bristles are pure nylon and manfacturer claims will last indefinitely. *H H M Products.*

Check No. 9 On The Time Saver Card

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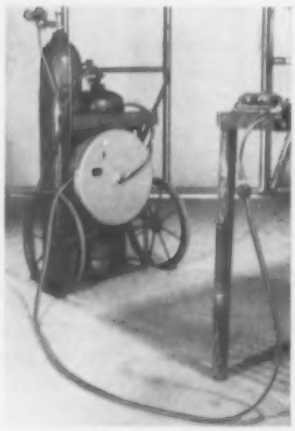


Weldreel Prevents Time Losses, Eliminates Tangles

The Weldreel is a new item for handling and storing dual welding hose either for portable or stationary use. Two universal type brackets permit mounting of the Weldreel overhead, on the wall, or on the floor in a 21 by 27-in. space as well as on a welding cart. The unit is well constructed of steel and brass and uses long-life Teflon seals on the rotating shaft for leakproof operation at all welding and cutting pressures.

The Model OA Weldreel is complete with 50 ft. of 3/16-in. or 40 ft. of ¼-in. dual welding hose, and may be purchased without hose if desired. A larger size reel handling up to 150 ft. of 5/16-in. dual welding hose will soon be in production. *United Specialty Corp.*

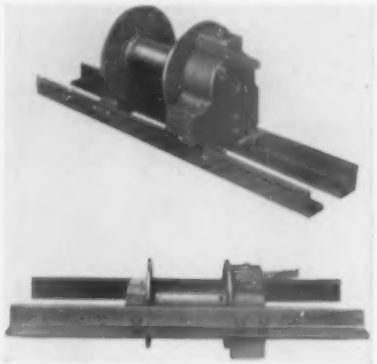
Check No. 10 On The Time Saver Card

●

Aluminum Gear Case For Winch Dissipates Heat

The new 7,000-lb. truck winches for standard and low mounting have been announced. Standard mount winch Model 7S is designed for installation behind truck cabs. Low mount winch Model 7L mounts in front or at rear of truck chassis, or back of cab. The low mount winch, a space saver, allows the entire truck platform to be used for the payload.

The winches are of the worm-gear, jaw-clutch, drum type, designed for slow, heavy pulls with intermittent operation. Their relatively slow speed



of operation makes them inherently safe.

A back-draft clutch on the winches insures forced engagement between drum shaft and drum for maximum operating safety. The clutch won't back out if engagement is only partial, but will work itself into full engagement.

The clutch is lubricated and fully enclosed in the gear case to protect against weather and dirt. Free clutch-control operation is assured at all times because of this construction. Winch gear case housing is of cast aluminum for faster dissipation of the heat generated during operation. The winch worm-shaft runs on self-contained ball-thrust bearings that require no adjustment, and the worm gear is an alloy phosphor bronze. The drum shaft is of heat-treated steel. *Gar Wood Industries.*

Check No. 11 On The Time Saver Card

When a prospective mud engineer joins the Magcobar staff, his school days are a long ways from being over.

In the extensive "Mud Doctor" training courses which Magcobar conducts regularly for its own personnel and those of oil companies, the student learns all that modern science knows about how to apply drilling mud knowledge to help oil operators drill better wells safely at lower costs.

Magcobar keeps its engineering service organization in tune with the needs of the industry. When you need help at your well, call your Magcobar engineer. He is ready day or night to help you meet any mud emergency.

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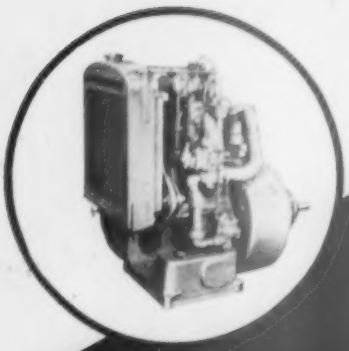
HOUSTON, TEXAS
ONE OF THE DRESSER INDUSTRIES

Magcobar

HERE'S WHERE WE ADD "MD" TO AN ENGINEERING DEGREE



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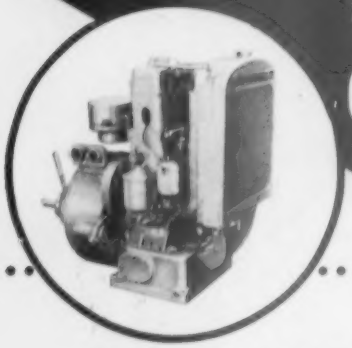
NORDBERG POWER CHIEF GAS ENGINES



...for dependable, low cost oil field service

• NORDBERG *POWER CHIEF* Gas Engines are low cost, medium speed units, built for rugged oil field service. In jobs like production pumping and rig lighting, where 'round-the-clock performance is a must, you'll find these sturdy *POWER CHIEF* units capable of delivering maximum power at minimum operating and maintenance cost—day-in, day-out.

Available as straight power units, delivering 18 hp max., with stub shaft or clutch power take-off . . . and as "packaged" generator sets producing up to 10 kw, Nordberg *POWER CHIEF* Gas Engines are simple to install and easy to maintain. And remember . . . these compact units are backed by the same reputation for dependability as the larger Nordberg Diesel, Gas and Duafuel® Engines used across the nation for efficient pipe line pumping.

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They're NEW

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- Brochures

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If You Use Water. Illustrated liberally with two-color diagrams, the 24-page booklet discusses the fundamentals of the three major classifications of industrial water treatment based on ion exchange; softening, dealkalization, and deionization. Under each of these classifications, the booklet presents the major process variations. The advantages of the various water treatment methods are discussed and interpreted in terms of the applications in specific industries. *Rohm & Haas Co.*

Check No. 12 On The Time Saver Card

●

GMVA Compressor. Comprehensive engineering details of a new engine-driven compressor, the GMVA, are presented in a descriptive Bulletin No. 75. The bulletin shows the latest developments in mechanical scavenging of two-cycle engines by rotary blower. Performance charts diagram resulting increases in engine power and fuel savings. Cutaway drawings provide complete engine details, installation and operation data. *The Cooper-Bessemer Corp.*

Check No. 13 On The Time Saver Card

●

New 2,000-Psi. Mudwonder Valves. A new catalog and price list covers the new 2,000-psi. w.p. (4,000 psi. test) as well as the 3,000-psi. w.p. (6,000 psi. test) mud-line valve. Interchangeability of parts is a big economy feature in the Mudwonder line. The one-piece seat insert of buna-N molded integrally to steel wear rings, and the hard-chromed gate, plus most of the other parts are interchangeable between the 2,000 and 3,000-psi. w.p. valves. *Edward Valves, Inc.*

Check No. 14 On The Time Saver Card

●

Plug-Valve Actuators. An eight-page Bulletin 3020 on plug-valve actuators describes tandem-type actuators for valves requiring relatively high torques to operate, and the new floating-bar type actuators for use on valves requiring lower operating torques. The

bulletin also shows actuator selection table, typical applications, dimensions and weights, and various mountings. *Ledeen Manufacturing Co.*

Check No. 15 On The Time Saver Card

●

Type F-60 Triplex Plunger Pump. A 60-hp. triplex plunger-type pump developed for water-flooding, salt water disposal, and other oil-field services, as well as for various petrochemical and refining purposes, is described in four-page Bulletin No. 418. Specifications, performance, and 15 features of this pump are given. *The National Supply Co.*

Check No. 16 On The Time Saver Card

●

Saddle-Mounted, Vertically Split Centrifugal Pumps. The new Bulletin W-341-B11B describes materials of construction, coverages available, pressure-temperature limitations, with cross-section drawings of the various types of pumps in a heavy-duty line designed for continuous duty in all boiler circulation and heater drain services. *Worthington Corp.*

Check No. 17 On The Time Saver Card

●

Many Uses for Asphaltic Coatings. Booklet GM-100, an eight-page booklet, provides coating information in easily read form. In addition to rust prevention, the booklet names the following uses for Insul-Mastic reinforced asphaltic coatings: Vaporsealing thermal insulation, waterproofing building walls, dampening sound and vibration, controlling condensation, and insulating. The latter two functions are accomplished by adding granulated cork to the coating. *The Insul-Mastic Corp. of America.*

Check No. 18 On The Time Saver Card

●

Lebanon Steel Foundry illustrates the growth, facilities, personnel, and some of the major products cast by the firm which was founded in 1911. Particular emphasis is placed on engineering and research work. End uses of castings in the petroleum industry are illustrated. *Lebanon Steel Foundry.*

Check No. 19 On The Time Saver Card

●

Protective Coatings by Ceilcote. Purpose of this eight-page publication No. C-150 is to simplify the complex problem of selecting the correct protective coating for various industrial installations. It offers a complete line for wide

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THE NEW HERCULES TYPE "SO-MK" TUBING HEAD

equipped with *mandrel* to suspend tubing with special adjusting "Pack-off" Nipple for "macaroni" string. Packs off instantly when lowered to rest inside of head. Designed especially for use with KOBE Pumps. Can be converted to a Regular Type Head by replacing parts. Hydrostatically tested to 4500 pounds. Will support weight of 10,000 feet of tubing.

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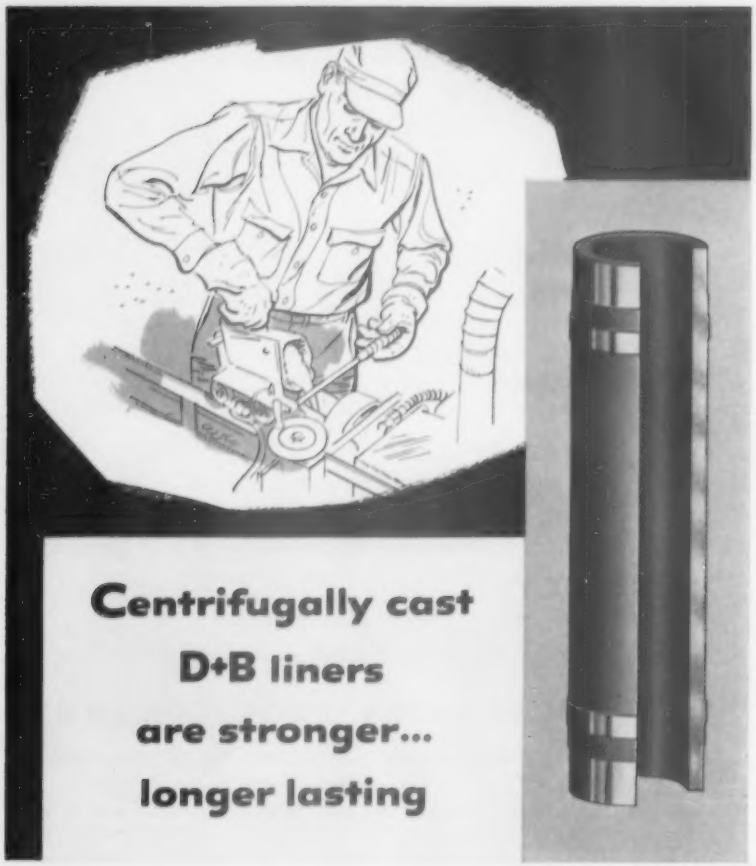

Centrifugally cast D+B liners are stronger... longer lasting

Highest pumping efficiency and economy result from the strength and wear resistance of D+B Liners. Centrifugal casting of D+B Liners provides a dense, uniform liner... free from impurities and mechanical defects.

Precision honing of the working surface increases the effective bearing area... assures a perfect seal and longer liner life. Rigid inspections from raw material to finished product insure liners of exacting standards of quality.

D+B Endurall Liners are made of a special analysis stainless alloy, especially resistant to corrosion and abrasion. H-C-I (hardened cast iron) Liners made of molybdenum alloyed cast iron, are recommended for severe pumping duty.

For D+B sub-surface pumps and pump parts, call your nearest D+B or CONTINENTAL Supply Store.

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E-171

range of service conditions. Complete data on nine different coatings are presented in the catalog to assist the user in the selection of the one best suited to any individual application. Information given on each coating includes base formulation, temperature resistance, abrasion resistance, chemical properties, adhesion, method of application, surface preparation, and colors. *Ceilcote Co.*

Check No. 20 On The Time Saver Card

●

The Inside Story of Today's Most Advanced Shovel-Crane Control Systems. Comparing the efficiency and reliability of the Speed-o-Matic power-hydraulic control system with those used on automobiles, machine tools, and other modern machines, the manufacturer claims a production increase up to 25 per cent for users. Another stated benefit is the elimination of up to 150 working parts in drum clutches and swing clutches. Cartoons, diagrams, exploded views, and on-the-job photographs illustrate Speed-o-Matic's operating principles and advantages. *Link-Belt Speeder Corp.*

Check No. 21 On The Time Saver Card

●

Solving Steam Trap Problems. The revised 36-page catalog includes information on the new combination float and thermostatic traps, which vent air in one-eighth the time of standard inverted bucket traps. In addition, the catalog contains specifications and capacities on steam traps, float traps, air release valves, and pipeline strainers. It tells how to calculate condensation loads and select traps for all classes of equipment. *V. D. Anderson Co.*

●

Check No. 22 On The Time Saver Card

Accurate Scale Models Today . . . Operating Industrial Plants Tomorrow describes the use of scale models in conjunction with design of processing plants. The Study Model is used to find the best equipment arrangement and to firm up the plot plan. The Design Model is used to design piping and to bring the project to completion. The Check Model is a mechanical check of design. *Project Models, Inc.*

Check No. 23 On The Time Saver Card

●

Preventive Maintenance Cuts Annual Shutdown Time is a case history involving chemical cleaning of piping systems and process equipment in a petroleum processing plant. A regular preventive maintenance plan is outlined. In the case of the plant described, semi-

annual outages were reduced 11 days each. *Dowell Incorporated.*

Check No. 24 On The Time Saver Card

●

Model SCW Treater. Catalog 31-04 features a four-color flow diagram, dimensional drawings, and complete description of a cold-weather modification of the Model S treater. The SCW is an emulsion type treater. *Black-Sivalls & Bryson, Inc.*

Check No. 25 On The Time Saver Card

●

Rotary Drilling Outfits with Hydraulic Torque Converters. The building-box principle of integrating interchangeable units of a rotary drilling outfit is featured in a 20-page, multicolor brochure. Engines, torque converters, gear transmissions, draw works, control panels, pumps, crown and traveling blocks, rotary tables, swivels, and hooks are described. *Haniel & Lueg G.M.B.H.*

Check No. 26 On The Time Saver Card

●

Condensed Catalog of Jerguson Gages and Valves. New Catalog 236 covers the complete Jerguson line of liquid-level gages and valves with a condensed presentation of the most pertinent data and specifications. Included are illustrations of the various standard and special function gages and valves, description of features and uses, materials used, ratings, dimensional drawings, standard and optional construction features, and specifications. *Jerguson Gage & Valve Co.*

Check No. 27 On The Time Saver Card

●

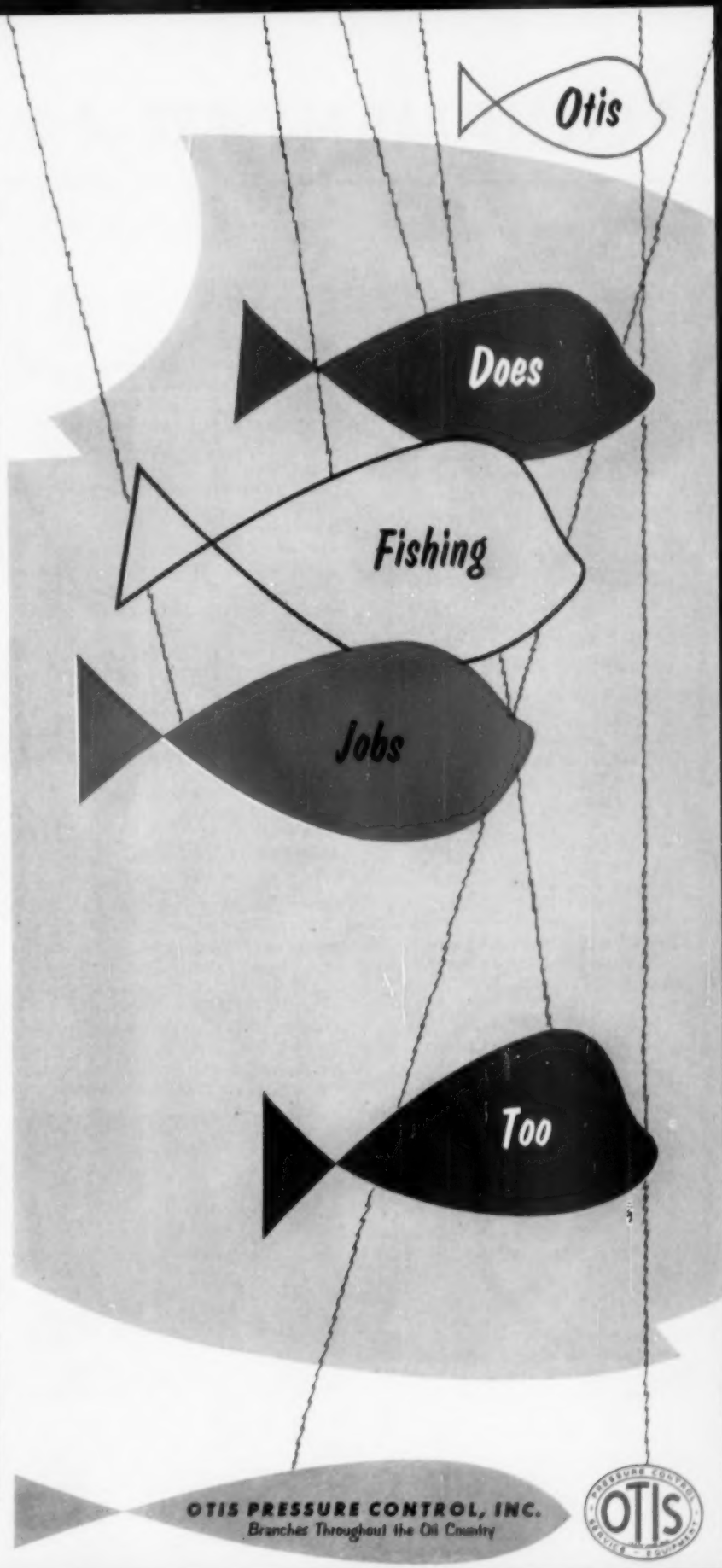
Welding Alcoa Aluminum. In the 176-page book, the vast knowledge of Alcoa's aluminum research laboratories is combined with the practical experience of its process development laboratories. Photographs and drawings are coupled with the comprehensive text to illustrate all the practical methods for welding aluminum. These include torch welding, arc welding including inert-gas shielded arc welding, resistance welding, and pressure welding. *Aluminum Co. of America.*

Check No. 28 On The Time Saver Card

●

Otis Removable Collar Stop which performs all of the functions of conventional bull plugs or pin collars, with the advantage of being easily withdrawn by wire line, is described in this illustrated data sheet. The unit also prevents tools from passing out of the tubing and into the casing or liner. It can be set in any collar, at any desired depth. *Otis Pressure Control, Inc.*

Check No. 29 On The Time Saver Card



EQUIPMENT MEN . . . in the News

Lufkin Names Slaughter To Wichita Falls Area

Ernest Slaughter, Jr., has been appointed district manager of the Wichita Falls, Tex., district of Lufkin Foundry & Machine Co. He joined Lufkin in 1949, and after serving a training period in the machine shop and engineering department, he was assigned to the West Texas district with headquarters at Odessa.

Hesser Represents Bell Rubber in Permian Area

Johnnie L. Hesser, of Odessa, has been appointed sales representative in West Texas and southeastern New Mexico area by Bell Rubber Co., of Dallas, manufacturers of tubing and drill-pipe swabs and accessory items. Before joining Bell, Hesser held sales positions with Bovaird Supply Co. and Wells Equipment Co.

Gulf Coast Area, Oilwell Announces Several Changes

M. F. Jones, Gulf Coast area manager for U. S. Steel's Oil Well Supply Division, has recently announced several changes. Lee R. Smith, manager of the Harvey, La., store, has been promoted to assistant manager of Oilwell's Southeast Texas-Louisiana-Mississippi district. Zack R. Moak has been made field representative at Brookhaven, Miss. Victor H. Blott, field representative at the Victoria, Tex., store, has been named district representative, expendable pump parts sales, and Clifton C. Light, employe of the Victoria store, was appointed to succeed him as field representative. Jones also announced the appointments of Thomas S. Kelley as manager of the Corpus Christi, Tex., store, and Floyd D. Weigers as field representative at that city, and Morris Haik to the same position in the New Iberia, La., store.

Smith will make his headquarters at Lake Charles, La., where he succeeds H. B. Tracy, who recently was named district manager at Wichita Falls, Tex. Smith, employed by Oilwell at Hobbs, N. M., in 1941, transferred to the Gulf Coast area the following year, and prior to becoming manager of the Harvey store, held store manager posts at Ville Platte, La., and Natchez and Brookhaven, Miss.

Moak was employed by Oilwell at its branch store at Brookhaven in 1948. Blott joined Oilwell in 1947, and before coming to Victoria he was associated with the Mission, Mirando City, and Corpus Christi, Tex., stores. Light was employed by the firm at Victoria in 1953.

Kelley joined Oilwell at Corpus Christi in 1952 and was promoted to field representative there earlier this year. Weigers was employed at the Corpus Christi store in 1952. Haik joined Oilwell at New Iberia in 1953 after 7 years of previous oil-field experience.

Republic Supply of California Represents Unit Rig

The Republic Supply Co. of California has been appointed exclusive California distributor for Unit Rig & Equipment Co.'s complete line of drilling equipment. Republic has 15 stores and offices in California, and sales representative in other western states. The company will stock the complete line of Unit Rig products including draw works, power compounds, pump drives, rotary tables, and other equipment.

Pictured above are J. J. Pike, president of The Republic Supply Co. of California, and Paul Courtney, president of Unit Rig & Equipment Co., completing distributor arrangements. Pike, left, signs the distributor contract.

McCullough Names Two New Sales Engineers

Appointment of two new sales engineers has been announced by O. J. McCullough, vice president of McCullough Tool Co.

Elmer E. Watts has been appointed sales engineer at the company's Sherman, Tex., branch. Watts became an

E. E. WATTS

W. O. JOHNSON

operating engineer at McCullough's Wichita Falls, Tex., branch in 1948, where he was stationed before his recent promotion.

W. O. (Mike) Johnson has been appointed sales engineer at the Healdton, Okla., branch. Johnson has been stationed at the McCullough Oklahoma City headquarters for the past 12 months. His oil industry experience dates back to 1945, and includes several years with Eastman Oil Well Survey Co., in Louisiana; store manager for Oil Well Supply Co. in Ville Platte, La., Eunice, La., and Casper, Wyo.; and store manager for Bethlehem Supply Co. in Casper.

Shelby, Mont., Store Opened by Lane-Wells

Reflecting growing oil activity in Montana, the third Lane-Wells branch in that state was opened on June 1 at Shelby. Bill R. Edmisson, the operator in charge, was transferred from Cody, Wyo. The other two Montana branches are in Glendive and Billings.

S. W. Crain, formerly subdistrict superintendent at Seminole, Okla., has been appointed assistant district superintendent of the Oklahoma district and transferred to Oklahoma City. He replaces E. D. Swartwood, who was transferred to Duncan, Okla., as a district sales engineer.

L. W. Denney, formerly radio-activity operator at Pampa, Tex., has been appointed district sales engineer at Pampa.

Sargent Engineering Appoints Key Officers

Sargent Engineering Corp., builder of deep-well oil-well pumps, has announced a reorganization and appointment of administrative officers, according to S. B. Sargent, president.

E. J. Sargent, who for 23 years has been vice president and director of production, has been made executive vice president and general manager. G. L. Sargent remains in the position of secretary-treasurer of the company.

Four new vice presidents have been named. H. L. Sargent has been made vice president in charge of the oil tool division; Thomas G. Foley, vice president in charge of production; Frank L. Weber, vice president in charge of internal auditing; and W. H. Sargent, vice president in charge of public relations and advertising.

The home plant, in Huntington Park, Calif., covers over two acres, and employs more than 500 men.

Youngstown Makes Key Sales Promotions

J. P. DeHETRE

Three department advancements have been announced by M. H. Watkins, general manager of sales for the Youngstown Sheet & Tube Co. They are:

John P. DeHetre from manager of oil country tubular sales to assistant general manager of sales. Charles T. McClure, formerly assistant manager, to manager of oil country tubular sales. Robert E. Hawley from assistant manager of oil country tubular sales to manager of line pipe sales.

DeHetre joined Youngstown in 1938 as an assistant field engineer in Los Angeles. He became a field engineer 6 years later and was transferred to Youngstown, Ohio, in 1948 as a development engineer. He became manager of oil country tubular sales in 1949.

C. T. McCLURE

R. E. HAWLEY

McClure joined the Youngstown Steel Products Co. of California, a subsidiary of the Youngstown Sheet & Tube Co., in 1947 as a field engineer. Early last year he was transferred to Youngstown as superintendent of field engineers and a few months later was named assistant manager of oil country tubular sales.

In 1936, Hawley joined the company as assistant consulting engineer in the water works division of pipe sales. He was transferred to pipe sales in 1941 and in 1949 was appointed assistant manager of oil country tubular sales.

Fort Worth National Promotes L. H. Bond

The Fort Worth National Bank's board of directors, at a meeting held recently, promoted Lewis H. Bond, Jr., from assistant vice president and petroleum engineer to vice president and petroleum engineer. Bond joined Fort Worth National's oil loan division in 1952 as petroleum engineer. He was appointed assistant vice president and petroleum engineer in 1953. He received his B.S. degree in petroleum engineering from the University of Oklahoma.

Pittsburgh Coke & Chemical Opens Dallas Sales Office

N. T. Shideler, manager of the protective coatings division, Pittsburgh Coke & Chemical Co., has announced that a new divisional sales office has been opened in Dallas. O. E. McCullough, Jr., has been appointed to this office in charge of cold coating sales.

McCullough had earlier been attached to the Pittsburgh office. Prior to that he had been director of personnel and sales manager of Stacey Dresser Engineering Co.

Smith Moved to Dallas By Welex Jet Services

Jack H. Smith has been named Dallas city salesman for Welex Jet Services, Inc. He has served as rigger in the field, administrative assistant to the executive vice president, and director of personnel in the Welex general office in Fort Worth. He joined the company in 1951.

Coale Named Baroid Sales Division General Manager

G. B. COALE

George B. Coale has been appointed general manager of the Baroid Sales Division, National Lead Co., succeeding George L. Ratcliffe, vice president of National Lead Co. Ratcliffe served as the general manager of Baroid prior to Coale's appointment.

Coale joined National Lead in 1935. At the time of his appointment as assistant general manager of Baroid in 1949, Coale was the chief engineer for National Lead.

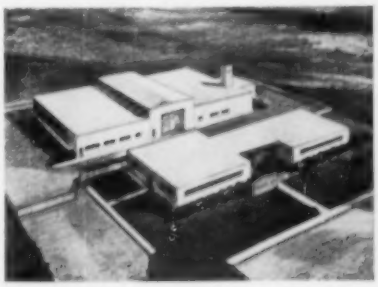
Ratcliffe will remain active with Baroid in his capacity of vice president.

Watkinson Named Ass't. Manager, Dewey Supply

A. R. WATKINSON

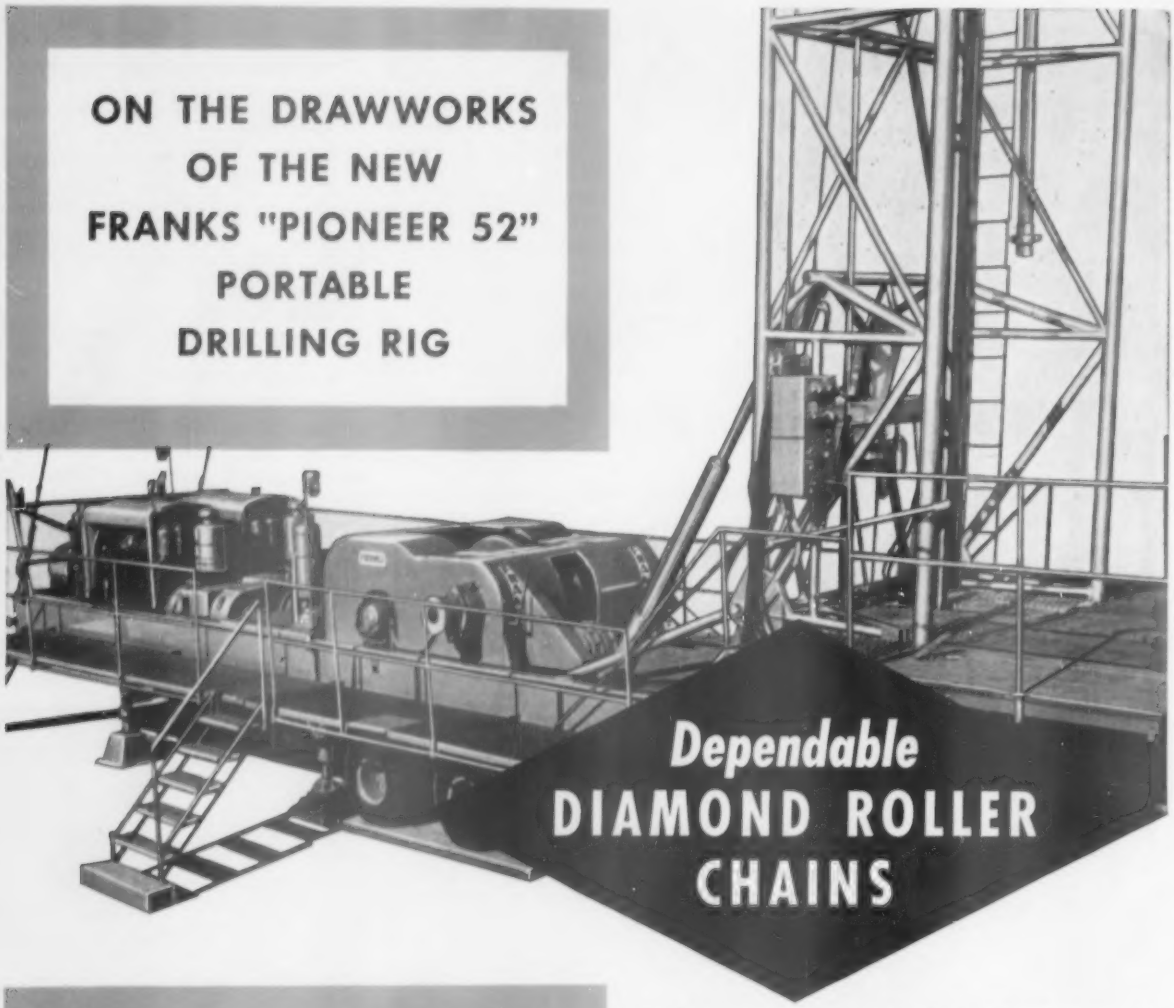
A. Rex Watkinson, Jr., has been appointed assistant manager of Dewey Supply Co., according to Clint Beard, vice president. Watkinson, who spent 10 years in the oil and oil-supply business before joining Dewey Supply, will also be in charge of sales for the Tulsa general office.

Work to Start Soon On Camco's New Plant



Construction will soon begin on the new $200,000-home office and plant for Camco, Inc. on Ardmore Street, just south of Old Spanish Trail in Houston. The plant was designed by James H. Howard & Associates. The office building will include facilities for general and engineering offices. The plant building will have approximately 22,000 sq. ft. of floor space with facilities for machine shop, welding, and heat-treating shops; assembly and testing of equipment; and shipping and receiving of materials.

ON THE DRAWWORKS OF THE NEW FRANKS "PIONEER 52" PORTABLE DRILLING RIG



Dependable DIAMOND ROLLER CHAINS

Diamond Roller Chains on the Drawworks of the Franks "Pioneer 52"

In the new "Lucky Seven Series" of Franks' portable well servicing and drilling units ("Pioneer 52" is the largest of these portable rigs), Diamond Roller Chains are used in the Drawworks. Their great reserve strength, *uniform* high quality, *proven* dependability and *long* life under the most severe conditions assure more footage in less time with fewer, shorter time-outs for repairs.

These are the vital qualities that Contractors demand to keep their rigs working and making money. These are the qualities Franks demands and gets, from Diamond Roller Chains. That is why drawworks in the "Lucky Seven Series" are equipped with dependable Diamond Roller Chains.

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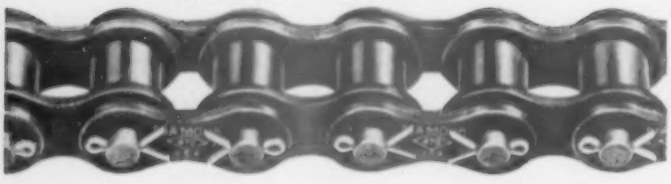
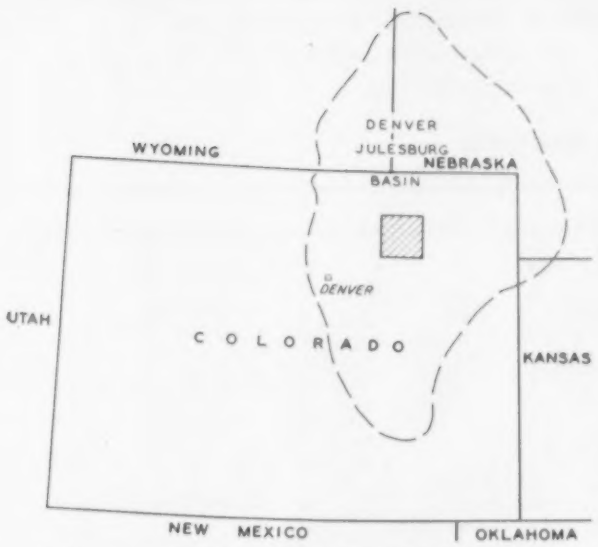
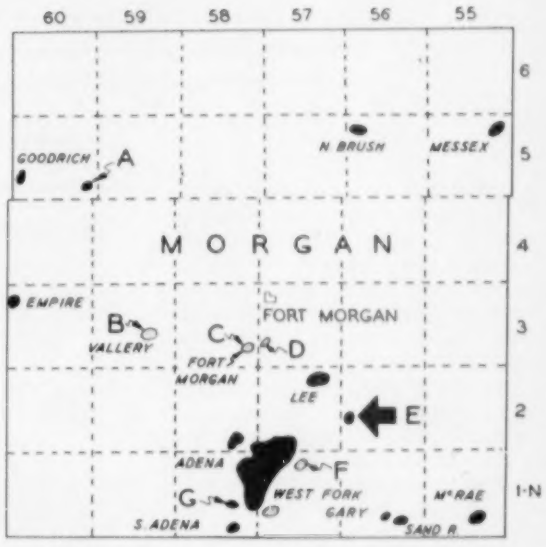
Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



DIAMOND **ROLLER CHAINS**



Morgan County lies in center of Denver-Julesburg basin.



Detail map reveals seven new discoveries since June 1.

Morgan's Record: 10 Discoveries in 6 Months

by Frank J. Gardner

NEAR the heart of the Denver-Julesburg basin lies Morgan County, Colorado, which has just witnessed its tenth oil discovery of 1954.

The year got off to a slow start for Morgan County; of 51 wildcats drilled up to May 15, 48 were dry. But then things began to pop, and in the past 5 weeks, 7 new fields and major extensions have boosted the county's discovery rate.

New strike encouraging . . . The most recent strike, and one that could be of greatest import for future development, is H. L. Hunt 1 Huey (arrow and E on map) in Section 21-2n-56w, a wildcat 5 miles northeast of the nearest oil production at Adena field. On a drill-stem test of the "D" sand of the Cretaceous-Dakota series at 5,070-94 ft., the operators announced a recovery of 2,520 ft. of oil. Total depth of the well is 5,187 ft., and casing has been set at 5,177 ft.

Two discoveries in the southeastern corner of the county set off the 1954 success campaign. Creslenn Oil Co. 1 State opened Gary field (1n-56w) with an initial potential of 60 bbl. of oil per day from the "D" sand at 5,100 ft. during the first week of January. This was followed quickly by the discovery at Sand River field, Kimbark Co. 1 Queen (1n-56w) which pumped 133 bbl. of oil per day from the "D" sand at 5,140 ft. in latter part of January.

The opening of South Adena field by Sunbeam (Eddie Fisher) 1 State in early April marked Morgan County's third 1954 discovery.

June strikes expand area . . . Things were quiet in Morgan County until June 1, when new strikes began to occur in all directions; up to July 1, six new fields or major extensions were finished, and a seventh, the Hunt well, was on the way.

At F on the map, J. A. McRae 1 Glenn was completed in the "J" sand at 5,461-83 ft. for 15,000 M.c.f. gas per day and shut in; location is just east of Adena field, and the well may prove to be an extension to that field.

To the southwest of Adena, in Section 26-1n-58w, an important extension wildcat was completed at Lion Oil Co. 1 Bruce (G on map); it is more than a mile from nearest production at Adena, and makes a very substantial addition to the "J" sand producing area west and southwest of Adena field proper.

Shifting to the northwest corner of Morgan County, O'Donnell, Edmondson & Sinclair opened a yet-unnamed oil field in Section 25-5n-60w (A on map) with their 1 Jacobson, swabbing 155 bbl. of oil per day from the "J" sand at 6,148-88 ft.

Meanwhile, in the central part of the county, southwest of Fort Morgan, three "D" sand gas strikes were finished, to focus exploration importance on a wide area of hitherto-unproductive territory. At B on the map is Vallery field, discovered by Ray Campbell & Colorado-Wyoming Drilling Co. 1 Ross (Section 23-3n-59w). This gasser was shut in after flowing an estimated 5,000 M.c.f. per day from the "D" sand at 5,901-26 ft. At D is S. D. Johnson's 1 Lind-Bacon, discovery well of Fort Morgan gas field, in Section 19-3n-57w; here, a potential gas flow of 2,000 M.c.f. gas and 40 bbl. of condensate per day was found in the "D" sand at 5,542-44 ft. and an extension well at C on the map, Aurora Gasoline Co. & Kingwood Oil Co. 1 Lauck, flowed 5,000 M.c.f. gas and 6 bbl. oil per hour from "D" sand at 5,554-58 ft.

Future is bright . . . Results like this are bound to have a considerable impact on Denver-Julesburg activities.

"Give Us Better-Trained Geologists!"

This is industry's challenge to American educators. And here's how our colleges and universities are answering—with better-balanced, more intensive curricula and improved field training.

John C. McCaslin

A RECENT survey of some of the leading educators in the field suggests that a higher level of geological training is being demanded by the industrial world. This trend presents a challenge to the various universities and colleges in the nation as well as to the geology students.

The schools of the country are meeting this challenge. Undergraduate training in the years following World War II suffered to a certain extent as a result of overcrowded classes, shortage of instructors, and lean facilities. This problem is being whipped rapidly as more money is being spent on smaller classes, selection of instructors has become more and more critical, and training facilities and curricula are periodically re-evaluated and adjusted to scientific and industrial demands.

The most important trend in geological training is an attempt to bring into geology better students with a better background in mathematics, chemistry, physics, and biology. One university does not propose to give any geology courses prior to the junior year, at which time those wishing to major in geology will have had 2 years each of mathematics, physics, chemistry, and some will have had biology.

The oil industry hires graduates in geology for many different kinds of work. This fact presents a definite challenge to the student. There is an ever-growing tendency and demand for hiring men with graduate work. However, most employers look for a type of man, more than for his type of training. The record of a man's formal education provides a prospective employer with a yardstick by which to measure his abilities, helping to determine his aptitudes.

Departmental Objectives

The objectives of the geology departments at leading universities are to produce well-rounded geologists with an understanding of the science and with preparation in basic related fields of science, such as chemistry, physics, and mathematics, rather than technicians who have been taught some of the methods and procedures in applying geology. Emphasis in all the courses in the various geology schools is on thoroughness in the understanding of principles.

In a capsule, here are the objectives of the geology schools of the nation:

1. A broad background in the basic sciences.

2. Emphasis on the relationship between the basic sciences and geological phenomena.

3. To teach the student to think and evaluate both qualitatively and quantitatively.

4. To realize the importance of the "space-time" concept in all geological studies.

5. A closer bond between student and professor.

6. A staff of instructors with a broad, scientific, and applied background.

7. A closely integrated research and training program, subject to the demands and adjustments of the times.

Student Objectives

Here is what the student should strive for:

1. The realization that basic geology is as it has always been . . . dependent upon mathematics, chemistry, physics, and biology as an important background.

2. A broad, basic academic background to enable him to make clean-cut decisions and recommendations.

3. A ready adjustability to environ-

Here's what Kansas University requires of geology majors:

B.S. in Geology

Freshman

English composition and literature
College algebra and trigonometry
General and historical geology
Engineering drawing
General biology
History

Sophomore

Inorganic chemistry
Qualitative analysis
Structural geology
Field methods
Mineralogy
Foreign language

Junior

General physics
Economics
Invertebrate paleontology
Stratigraphic paleontology
English composition and literature
Electives
Field geology (summer)

Senior

Economic geology
Advanced English composition
Sedimentation
Fundamentals of speech
Petrography
Electives

Note: The many electives permitted in the last 2 years of work for this degree make it possible for the student to take almost as many engineering and science subjects as the engineering student.

B.S. in Geological Engineering

Freshman

College algebra and analytic geometry
Plane geometry
English
Inorganic chemistry and engineering chemistry
Engineering drawing
Descriptive geometry
Speech
Shop practice elements and engineering lectures

Sophomore

Calculus
General physics
General and historical geology
Mineralogy
Restricted electives

Junior

Structural geology
Sedimentation
Paleontology
Stratigraphic paleontology
Field methods
Development of oil and gas lands
Dynamics
English advanced composition
Soil mechanics
Restricted electives
Field geology (summer)

Senior

Petrography
Geophysics
Economic geology
Ground water geology
Thermodynamics
Petroleum geology
Strength of materials
Photogeology
Fluid mechanics
Subsurface stratigraphy
Engineering economics

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THE OIL AND GAS JOURNAL

"Most universities offer three undergraduate curricula . . .

1. The B.A. degree, designed for those majors in geology who desire a maximum of liberal arts training . . .

2. The B.S. in geology degree provides a liberal-arts training with more intense specialization in geology . . .

3. The B.S. degree in geological engineering gives the student a geology specialization with an engineering background."

mental changes that are inevitable in the profession.

4. An ability to work and think with other geologists and engineers; cooperative attitudes are essential.

5. A realization that the balancing of an applied and scientific approach in solving geological problems is highly necessary.

Views on Curricula

In the majority of the schools about four out of five students interested in geology are enrolled in the college of arts and sciences as candidates for the B.S. degree in geology, rather than in the college of engineering as candidates for the B.S. degree in geological engineering. Since many specialized fields in geology are not emphasized in the geological engineering curriculum (paleontology, aerogeology, etc.) this ratio is not expected to be altered much.

Three curricula . . . Most universities offer three undergraduate curricula as well as extensive graduate training leading to the master's degree and to the doctorate.

Undergraduate curricula lead to the B.A. degree, the B.S. degree in geology, and the B.S. degree in geological engineering.

The B.A. degree is designed for those majors in geology who desire a maximum of liberal-arts training and who plan to supplement their undergraduate training by graduate study in geology.

The B.S. degree provides a liberal-arts training with a more intense specialization in geology.

The B.S. degree in geological engineering gives the student a geology specialization with an engineering background.

Requirements for the master's degree show that all candidates must have a general knowledge of mineralogy, petrology, historical geology (paleontology, stratigraphy), structural geology, geomorphology, sedimentation, regional geology, and one of the fields of applied geology such as petroleum geology, geophysics, or economic geology. The candidate must have a detailed background of knowledge of the field or fields in which his thesis is written.

Advantages . . . There are advantages and disadvantages to each of the three types of geological curricula. However, these can be integrated into a broad and well-rounded education.

The course in geological engineering offers the student a good background for geophysical or production work in the oil industry. More mathematics, mechanics, and other related subjects are stressed in this course of study than in the other two. Students interested in reservoir engineering are better equipped for work in that field if they follow the petroleum-engineering course of study, rather than geological engineering.

The B.S. degree in geology offers students many electives in their 4 years at college, making it possible for them to take as many mathematics and petroleum courses as the engineering students in many cases. From the technical standpoint perhaps the geological engineering course is the most desirable, except in the field of paleontology and related subjects. Some schools stress the fact that a broader and more well-rounded education is offered by the B.S. degree course of study. However, it is most generally agreed that the two fields of study should be integrated by use of electives offered to bring about an academic balance.

Other Trends

At one university a chief prospective change in the makeup of course offerings planned for study is the enlargement in the credit hours of so-called basic courses related to various fields of geology at the expense of what are now special ramified courses such as ground-water and Pleistocene geology, seismology, and physiography.

Language . . . Special attention in training students in better use of the English language is becoming more evident. More written reports are being required than ever before. These reports are carefully scrutinized by the instructors. The geologist is a scientist in every respect. His professional work after college will require him to do considerable written work, evaluating his decisions in words.

Courses in speech arts are required by most schools. The geologist will find himself standing before people throughout his career. His ability to express himself on paper and orally is most urgent.

A need for knowledge of a foreign language is becoming increasingly important, particularly for those who plan to work in the Near East or South America. Many schools offer special conversational courses in Spanish.

Field Work

There is a trend toward more fundamental field work in the various geology schools. This field work is essential for a better understanding of field relationships and office geology.

Field courses are required by all geology schools for the B.S. degree. The various schools offer attractive study programs in classic geologic areas of the country. The importance of this field study cannot be overemphasized. Field facilities are steadily being improved and broadened in scope.

Purpose . . . The purpose of these undergraduate field trips is to permit the student to get a first-hand look at structure and stratigraphy. The student prepares reports and maps of the area studied. Some of the favorite places of study are the Arbuckle Mountains, Criner Hills, Central Mineral region, and the Canon City embayment.

Results . . . The student becomes better acquainted with his instructors in the field. The instructor in turn learns more about the abilities and personality of the student.

An opportunity for cooperative thinking and working is given the student in groups of three or four. Advanced field work is offered. This work is done under the supervision of staff members on an individual basis, giving graduate credit and paving the way for masters' theses.

"Field courses are required by all geology schools for the B.S. degree. The various schools offer attractive study programs in classic geologic areas of the country."

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CANADA

Significant Oil Strike Made In British Columbia

A group of companies headed by Pacific Petroleums have struck what appears to be the most promising oil discovery in British Columbia to date. The new find came at an exploratory driller in the Buick Creek area of northeast B.C. about 23 miles north of Fort St. John region gas wells and 40 miles northwest of Fort St. John townsite.

The discovery was made at Pacific 3 West Buick Creek located on the southwest corner of Section 6 in Township 110w6 (according to B.C. surveys), about 3½ miles south and 2 miels east of the team's 2 Buick Creek completed Nikanassin gas well.

The oil was discovered in the Nikanassin formation, and approximately 28 ft. of oil zone was indicated, Pacific officials stated. The well had previously found a 39-ft. gas zone higher in the Nikanassin formation.

Initial drill-stem test to yield oil was run fraom 3,884 to 3,894 ft. for 1 hour. Naural gas flow was too small to measure, and pipe recovery was 110 ft. of clean, light-gravity oil. Interval 3,894 to 3,904 ft. flowed gas in 5 minutes, at rate too small to measure and 1 hour recovery was 2,780 ft. of light-gravity oil. Last test, from 3,904 to 3,914 ft., gave a small gas flow in 9 minutes and yielded recovery of 440 ft. of oil. The pay zone is from 3,884 ft. to 3,912 ft. Crew at last report had run 7-in. production casing to 3,892 ft., and well is currently standing cemented at total depth of 4,122 ft.

During drill-stem tests over the 39 ft. of gas section, down to top of the oil zone, the 3 Buick Creek well flowed natural gas at rates up to 8,500,000 cu. ft. daily, with the aggregate flow rate over the entire section being approximately 21,000,000 cu. ft. daily. The team's 2 Buick Creek gas well, about 4 miles to the northwest, found about 100 ft. of zone in the Nikanassin, with 78 ft. of good porosity. Completed as a gas well, this No. 2 venture flowed gas at rate 19,000,000 cu. ft. daily, without application of acid, Pacific officials stated. The well also has some naphtha along with the gas.

Manitoba . . . A four-company team of Calgary independents, including Madison Oils, Ltd., Alberta Pacific Consolidated Oils, Ltd., Sunset Oils, Ltd., and Share Oils, Ltd., has indicated discovery of light-gravity crude oil in the Ebor area of southwest Manitoba, about 5 miles east of the Saskatchewan border.

The indicated strike came at Madison 11-12 Ebor, LSD 11, 12-9-29w1, which is about 3¾ miles southwest of Daly oil wells, 10 miles northwest of Linklater Mississippian oil and 16 miles southwest of the town of Virden.

Reports state that the well found 43 ft. of Mississippian porosity, and that a 45-minute drill-stem test run at approximately 2,647 ft. gave up a recovery of 300 ft. of gassified oil, no formation water. Hole was taken down to about 2,672 ft., believed still in porous section, and crew was running string of production casing.

EASTERN CANADA

Ontario . . . Drilling in Lake Erie, offshore from the southern end of the old Tilbury gas field in Kent County, Consolidated West Petroleum 10 has finished in the Guelph Niagara formation with estimated open flow of 2,700,000 cu. ft. This is the tenth and largest successful completion of Consolidated's offshore drilling program. Consolidated 11 is being located.

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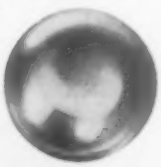

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ROCKY MOUNTAIN

MONTANA

Glacier County Discovery Flows, Two Locations Staked

Union Oil Co. of California and Carter Oil Co. reported a flow of 77½ bbl. of oil in 24 hours at 1 Tribal-544, C NW NW 19-37n-8w, in the Landslide Butte area of Glacier County. Test was of Banff (Mississippian) at 5,765-85 ft. The well flowed gas after 11 minutes and oil after 2 hours. A later test had a smaller gage, but both tests were on natural flow without treatment of any sort. The operators will acidize before final testing.

The discovery is some 7 miles west of Reagan field and immediately south of the Canadian border. It is regarded as of major importance to over-all exploration in Montana.

Carter and Union have made two new wildcat locations in the general area. A mile northwest of the discovery they will drill 1 Tribal-533, C SE SE 13-37n-9w. Four miles southeast location has been made for 1 Tribal-534, C SE SW 4-36n-8w. Both will test lower Mississippian zones.

WYOMING

Carbon County Discovery Completed

McElroy Ranch Co., Natural Gas & Oil Co., and Bruce Anderson have reported a completion gage of 5 bbl. of oil per hour flowing through an open 2-in. tubing at 2 Horne, NE NE SW 11-20n-79w, in the South Big Medicine Bow area of Carbon County. Production is from Muddy. Casing was perforated at 5,428-32 ft. The well was originally scheduled as a test to Sundance, but was not continued to that formation after commercial tests were made in Muddy sand. A twin well is now drilling below 3,721 ft. to test Sundance. Production is found both in Sundance and Tensleep at Big Medicine Bow about 2 miles to the north.

North Fork Confirmation Flows From Tensleep

Stanolind Oil & Gas Co. has completed a second well in the North Fork Unit, Johnson County. The well is 2 Unit, C NW NW 30-44n-81w. Production is from Tensleep with the top of pay found at 6,483 ft. The well was completed in open hole, and the completion gage was on ½-in. choke. The operator completed the North Fork discovery in 1951 for a flow of 173 bbl. of oil daily. The new pool is northwest of Tensleep production at Sussex and Salt Creek.

COLORADO

Discovery Well North of Adena to Be Tested Further

H. L. Hunt is waiting on cement at 1 Huey, C SE SE 21-2n-56w, Morgan County. The well is an apparent D sand discovery about 5½ miles north of Adena field. On test of the interval 5,070-94 ft. recovery was 2,520 ft. of oil, 420 ft. of brackish water and 60 ft. of oil and gas-cut mud. Tool was open 1 hour. There was gas at the surface after 15 minutes. Total depth is 5,187 ft., and casing was run to 5,177 ft.

The discovery adds new interest to the general area which has been the most active in Colorado and one of the most active in the Rocky Mountains during the first 6 months of this year due to the development of a major field at Adena.

NEBRASKA

Banner County Discovery

Carmack Drilling Co. of Denver has reported a pump recovery of approximately 75 bbl. of oil per day at 1 Stauffer, SW SW SE 34-19n-55w, Banner County. The well produces from the J sand, and was Sandfract prior to testing. It is north of production in Hinshaw field, a 1954 discovery.

This general Banner County area has become one of the most active in the state. O'Donnell & Edmondson of Denver and Phillips Petroleum Co. have recently staked a series of three wildcats in 18n-54w, 18n-55w, and 19n-55w in this county.

LOUISIANA

SOUTH LOUISIANA

Halter Island Field Gets First Crude Oil Producer

First oil production in Halter Island field, Terrebonne Parish, is being tested by Humble Oil & Refining Co. at its 3-K Louisiana Land & Exploration Co. Previous production in the field, discovered early in 1953, has been gas and condensate.

Oil zone in the new Humble well, fifth for the field, is perforated at 10,704-10 ft. Flow through ⅞-in. choke gaged 360 bbl. per day with gas-oil ratio of 820 cu. ft. per barrel, and pressure of 2,200 psi. Gravity of the oil is 36.1°.

A prior test slightly higher in the sand at 10,687-10,700 ft., resulted in a flow of 108 bbl. of condensate and 5,400,000 cu. ft. of gas daily through ¼-in. choke.

Other gas-condensate production is from sands at 7,550 ft., 9,460 ft., and 10,000 ft. Both Humble and Shell Oil Co. are operators in the field.

CALIFORNIA

Deep Test Started on Ventura Avenue Flank

Lloyd Corp., Ltd., is abandoning the lower portion of 1 William Sexton, which in 1951 was completed as a 1-mile east extension to the D-6 pool at Ventura Avenue, and will utilize the upper portion for a deep flank test. It was expected hole would be plugged to about 2,000 ft. and then directionally drilled to a depth below 15,000 ft.

The well originally was completed in the D-7 zone at 12,901-13,051 ft. but following collapse of the liner was plugged back and completed in the D-6. Objective of the redrilled hole probably will be horizons encountered at Lloyd 3 Sexton in SW 20-3n-22w, ¾ mile southwest. This test was bottomed at 15,721 ft. last July but still has a rig over the hole. It is anticipated final perforations shortly will be made and the well completed.

Oxnard Blowout Controlled

Standard Oil Co. of California 2 McInnes, a southwest stepout to the basal Sespe discovery recently recorded at Oxnard, Ventura County, was brought under control after

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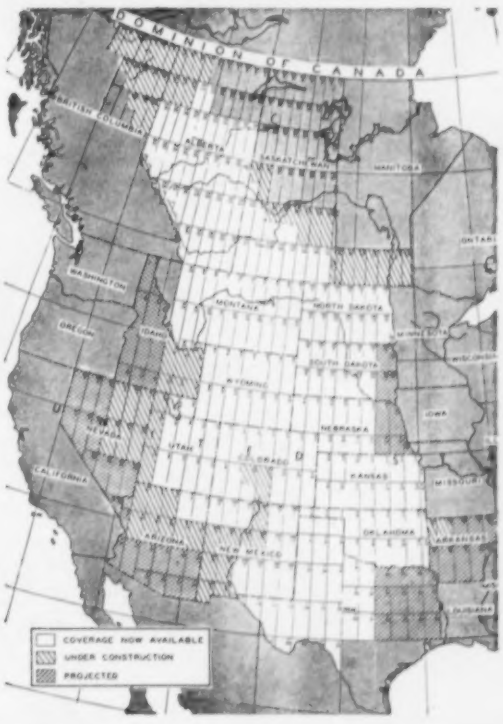

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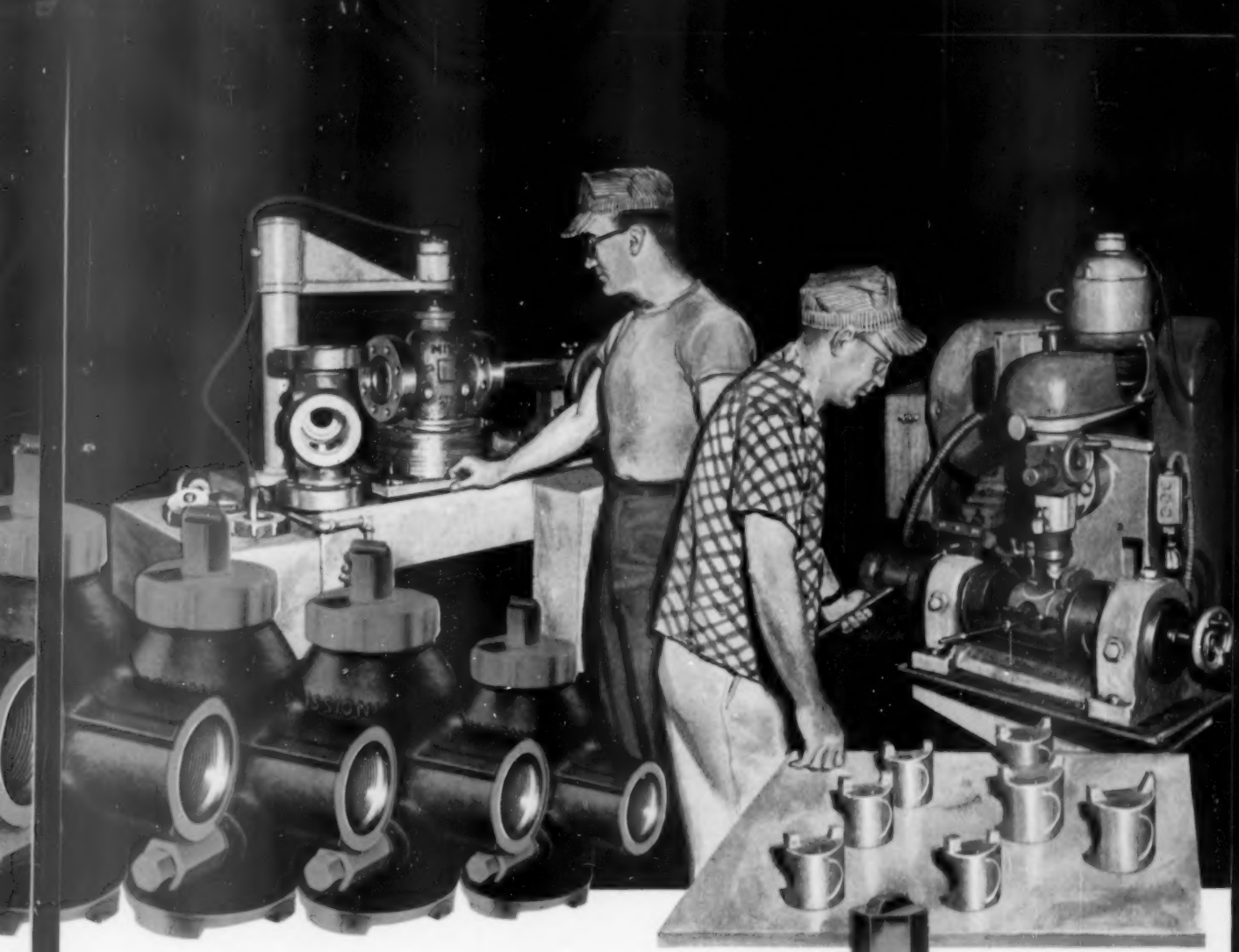

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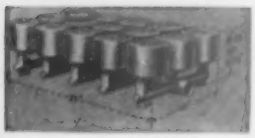

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flowing uncontrolled for a few hours. Cause of the blowout was credited to a leak in the cellar. Prior to the accident the extensioner was flowing light crude at a 1,000-bbl. daily rate through a 13/64-in. choke, from a total depth of 9,401 ft.

SOUTHEAST NEW MEXICO

Deep Well Scheduled Near Anderson Ranch

Continental Oil Co. has announced plans to drill a 13,700 ft. Devonian wildcat 4 miles west of Anderson Ranch field in Lea County. The project will be 1 West Anderson Ranch, in 6-16s-32e.

Langlie-Mattick field exploration . . . Anderson-Prichard Oil Corp. 1 American Republic-Federal, deep test in 28-25s-37e, 2 miles east of Jal, made a high flow of gas and was temporarily out of control after drilling 110 ft. into the Devonian. The project logged top of the Devonian at 8,240 ft., elevation 3,023 ft., and started blowing gas at 8,350 ft. Estimated daily rate of flow was 60,000,000 cu. ft. Location is in a San Andres producing area.

Pennsylvanian prospect . . . Stanolind's Oil & Gas Co. 1 Buffalo Unit, deep wildcat 3 miles north of shallow production in Tonto pool, flowed gas and unloaded some distillate on a drill-stem test of the Pennsylvanian from 13,200-13,280 ft. Gas showed at the surface in 1 hour and 25 minutes and flowed at the rate of 1,320,000 cu. ft. daily. Coming out of the hole, the well unloaded gas, distillate and mud-cut water blanket. Drilling continued.

This well has also showed for production from the Bone Springs between 10,300-10,350 ft., and has flowed oil from the upper Wolfcamp at 10,560-10,619 ft.

KANSAS

Kingman County Venture Recovers Oil in Mississippi

Pickrell Drilling Co. tested good shows of oil and gas at their southern Kingman County wildcat in the Sedgwick basin. A drill-stem test is being taken at 4,250-80 ft. in the Mississippian topped at 4,198 ft.

Recovery on a drill-stem test at 4,202-20 ft. was 200 ft. of oil and gas-cut mud. Another test at 4,220-50 ft. recovered 90 ft. of oil and gas-cut mud, 120 ft. very heavily oil and gas-cut mud, 100 ft. gassy oil and 20 ft. water.

Casing Set at New Gas Discovery in Barber

Barber County has a new Douglas and Mississippian gas discovery at Musgrove Petroleum Corp. 1 Early, SE SE SW 4-33s-11w, 1¼ miles north of Rhodes pool and 3 miles northeast of Gerlane.

The discovery gaged 5,408 M.c.f. of gas per day during drill-stem tests of the Douglas and Mississippian.

Harper County Prospect Recovers Free Simpson Oil

Gulf Oil Corp. is making tests in the Simpson at their 1 Rife, SW NE SW 31-33s-6w, prospective strike 11 miles northwest of Bluff Creek pool and 1 mile south of Anthony, Harper County.

Recovery on a drill-stem test at 4,950-60 ft. in the Simpson dolomite was 4,300 ft. of gas, 35 ft. of clean 41°-gravity oil and 30 ft. heavily oil and gas-cut mud.

Oil Recovered at Rank Rawlins County Test

Ashland Oil & Refining Co. have recovered oil on two drill-stem tests at 1 Kacirek, NE SE SW 8-2s-36w, about 44 miles from nearest production in Rawlins County, northwestern Kansas. Recovery from the Topeka lime was 800 ft. of heavily oil-cut mud and 40 ft. of oil-cut salt water.

Another test taken at 4,309-31 ft. recovered 1,140 ft. of gas, 240 ft. of free oil and 12 ft. of oil-cut mud.

MICHIGAN

While Pure Oil Co. completed its second deepened Reed City field well, Osceola County, in the Richfield sand horizon as a good 100 bbl. a day oil producer after a petro-frac treatment, Ohio Oil Co. had its first deepened well in the pool ready for test and completion in the Richfield after well flowed oil from this sand horizon pay on drill-stem test. All three of the completed Richfield oil wells in Reed City pool to date are deepened Reed City zone producers and are all 10-acre offsets to each other.

The new Pure Oil Co. completion was its 1 Lomp, NW NW NE 31-18n-10w, Lincoln Township, which showed 12 ft. of good, clean Richfield sand pay and was bottomed out at 4,632 ft. Well swabbed and flowed at an

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average rate of 30 bbl. of oil a day natural. The 100-bbl. a day rating was established after a 3,000 lb. sand and 3,000 gal. acid fracturing treatment. Hole was plugged back 1 ft. prior to being treated. The 1 Lomp is the diagonal southeast 10-acre offset to the 1 Gingrich discovery.

TEXAS

WEST TEXAS

Tom Green Discovery Completed for 408 Bbl.

Tom Green County activity was in the news last week, with one Canyon sand discovery completed, two wildcat locations made and an offset assured in the new H. J. Strawn field south of Christoval.

The new producer is Phillips Petroleum Co. 1-A Griffith, 52-25-H&TC Survey, 10 miles southeast of Christoval. Completion potential of 408 bbl. was based on a 10-hour flow of 170 bbl. of oil through ½-in. choke, from perforations between 4,778-96 ft. Top of the Harkey sand (local name) was 4,770 ft., on elevation of 2,371 ft. Nearest similar production is in Butler field of northern Schleicher County.

On the southwest side of H. J. Strawn field, Stanolind Oil & Gas Co. 1-B Louise Anson picked up the Strawn top 29 ft. high to the field discovery, then flowed oil on drill-stem test. Sample-top on the Strawn was 5,288 ft., minus 3,183 ft. On a 70-minute test between 5,484-5,579 ft. gas flowed in 4 minutes and oil in 10. Choked down to 6/64-in., the well produced 8 bbl. in 1 hour, with no water. Flowing pressure was 2,250 psi. A second test was under way between 5,540-5,625 ft.

New locations included Stanolind 1-L Johnson, scheduled to 6,500 ft. in Section 40-25-H&TC Survey, 10 miles east of Christoval. Operators were waiting on permit. Location is 3 miles northeast of Phillips 1-A Griffith.

H. Bryan Poff, Fort Worth, has made location and was to start drilling immediately at 1 Mrs. Eleanor Ralfman, in Section 153-11-SPRR Survey, 5 miles west of Wall. Projected depth was 5,000 ft.

SOUTHWEST TEXAS

Odem-Angelita Wildcat Tests Deeper Oil Zone

A new oil discovery, located north of Angelita field and west of Odem field, in western San Patricio County, has been made by Spartan Drilling Co. at its 1 Lawhon.

The well, testing pjerforations at 7,677-83 ft., flowed at the rate of 5 bbl. of oil per hour through ¼-in. choke with tubing pressure of 1,635 psi. Total depth is 7,748 ft.

Nearest oil production, ½ mile east in Odem field, is from a 3,000-ft. sand.

TEXAS GULF COAST

Shallow Oil Production Indicated at Davis Hill

First oil production for the old Davis Hill salt dome, in northern Liberty County, is in prospect, closely following the recent discovery of dry gas.

The possible oil discovery has been made by L. D. Hindman in a core test, 1 Pickett et al., in which an oil-saturated sand was found in a core cut at 1,721-30 ft.

The sand immediately overlies the dome's cap rock, to which the hole was deepened. Total depth, at 1,750 ft., is 3 ft. in the cap. Casing has been run to bzottom for production tests of the shallow sand.

Location is 1½ miles south of the small dry-gas well recently completed by The Texas Co. as the dome's first production. The latter well, 1-C Wirt Davis estate, produces from a sand at 3,548-70 ft. Flow through 8/64-in. choke was gaged at 741,000 cu. ft. per day, with pressure of 1,325 psi. Texaco is drilling a projected 9,500-ft. test 1,300 ft. to the northeast at 2-C Davis.

New Deep Production Opened at Sour Lake

Gas-condensate production has been opened in deep sands off the northeast side of Sour Lake field, in Hardin County. Discovery well, drilled by Clegg & Hunt at 1 Hooks, is 1½ miles from nearest other production in the field.

The new production is from two zones, both in the Yegua section. From the lower zone, perforated at 10,006-14 ft., the well flowed at the rate of 6,000,000 cu. ft. of gas daily, spraying 53.5°-gravity condensate. From the upper zone, perforated at 9,826-34 ft., flow was at the rate of 12,600,000 cu. ft. daily with 54.2°-gravity condensate.

Blue Ridge Outpost Test Discovers Vicksburg Oil

Christie, Mitchell & Mitchell have a new Vicksburg oil-discovery well about ¾ mile south of Blue Ridge field, in Fort Bend County, where their 1 West-Schenck, in T. Habermacher Survey, has been completed with

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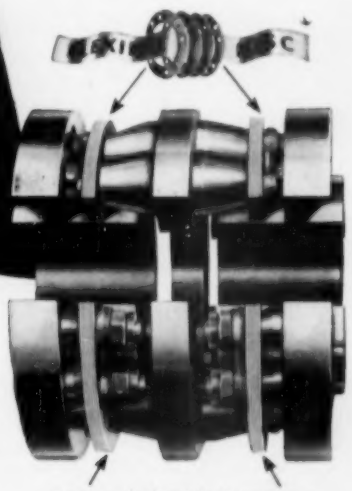

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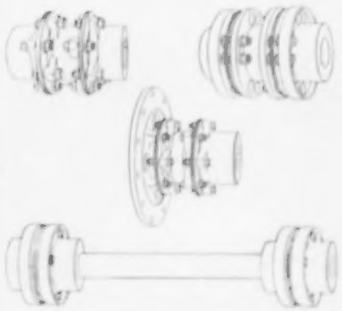

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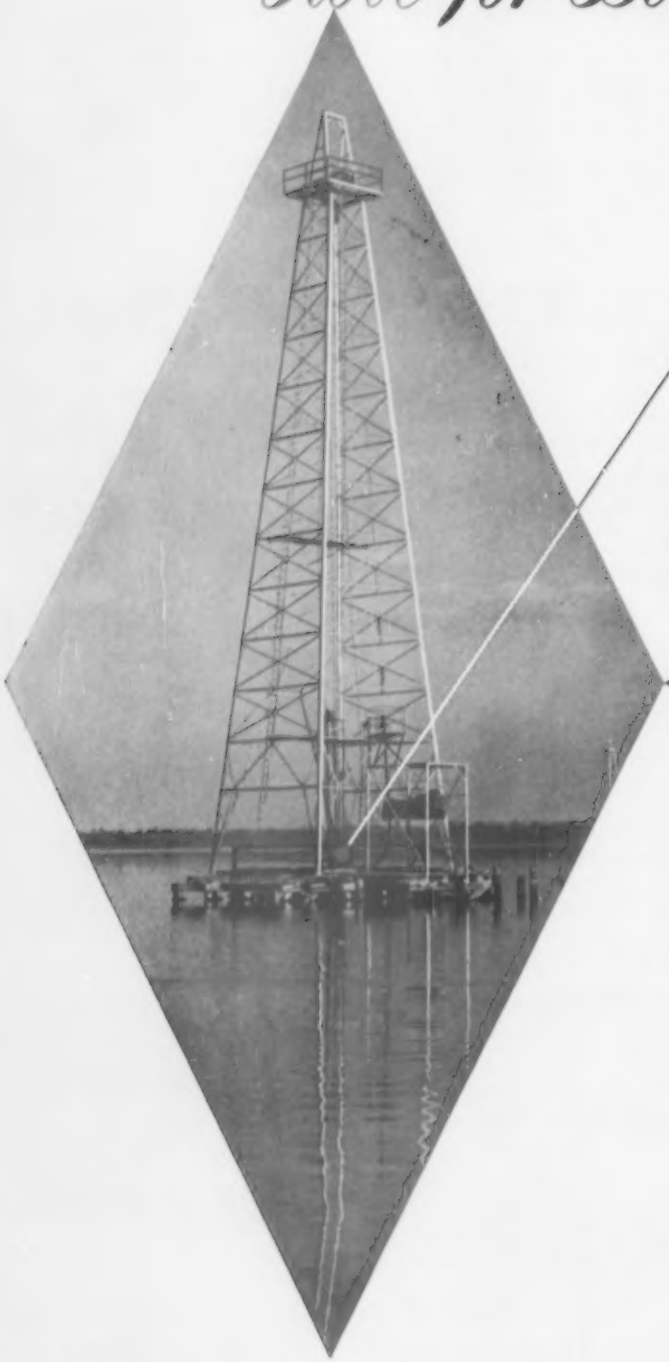

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a daily flow of more than 170 bbl. of 22.7°-gravity oil, gaged on 8/64-in. choke. Flow was with pressure of 925 psi. Pay is perforated at 7,815-19 ft. Hole was drilled to 7,956 ft. Nearest Vicksburg production is more than 3 miles to the north in North Blue Ridge field.

HUGOTON EMBAYMENT

Dual Pennsylvanian Strike Reported in Ochiltree

Ochiltree County in the Texas Panhandle, the latest area to come into the deep Pennsylvanian play in the Hugoton embayment, has a dual discovery assured at The Texas Co. 1 Sophie Pearson Daniel "A," 9 miles south of Waka and 9 miles southeast and northwest of Pennsylvanian production.

The well flowed 6,000 M.c.f. of gas per day from perforations at 7,343-51 ft. The well also flowed 4,830 M.c.f. of gas and 10 bbl. of distillate in 24 hours from the Morrow sand through perforations at 7,551-60 ft.

Hansford Discovery Shut In As Multiple Pay Well

Colorado Oil Co. and R. H. Fulton 1 Steele, Hansford County 3-pay discovery in the Pennsylvanian, is shut-in. The well flowed 4,100 M.c.f. of gas per day from Tonkawa perforations at 5,256-78 ft. It also flowed gas from Oswego at 6,051-66 ft. From the Atoka it flowed gas at 6,633½-42½ ft.

R. H. Fulton 1 Jackson, 9 miles to the southwest, is a new pay discovery in the area. The Atoka discovery flowed an estimated 10,000 to 12,000 M.c.f. of gas per day from Atoka perforations at 6,904-13 and 6,917-27 ft. It is 5 miles northeast of Spearman and ¾ mile west of Fulton 1 Matthews, Morrow sand gas discovery.

Harrison Discovery Is Testing In Texas County

United Producing Co. 1 Harrison, NW SE 25-2n-19eCM, 1 mile north outpost to the recent Sillars discovery which extended Southeast Camrick field 3 miles northeast, flowed 26,500 M.c.f. of gas per day from Morrow sand perforations at 6,755-80 ft.

MISSISSIPPI

Tuscaloosa Oil Discovery At Sweetwater Confirmed

A. O. Phillips' lower Tuscaloosa oil-discovery early this year at Sweetwater, in southeastern Lincoln County, is being confirmed by Sinclair Oil & Gas Co. at its 1 Moak-Lawrence Unit, north offset to the discovery well.

Sinclair's well, perforated at 10,786-94 ft. in the discovery well's pay zone, flowed at the rate of 139 bbl. of 38.9°-gravity oil per day on tests through ⅛-in. choke. Gas-oil ratio was 100 cu. ft. per barrel, and pressure 700 psi.

The discovery well's east offset, drilled by Shell Oil Co., was completed as a dry hole. No other wells have been drilled.

APPALACHIAN AREA

PENNSYLVANIA

Grant Township, Indiana County, Southwest Pennsylvania, Fairman Drilling Co., has located 1 Minnie Mariskanich and completed the rig at 1 H. G. Stanley, in Pine Township. In this township, T. W. Phillips Gas Co. 1 Fee, shut down at 8,158 ft., recording the Oriskany sand 8,136-8,149 ft. In Cherry Hill Township, Chestnut Ridge Oil & Gas Co. 3 Ralph White, is drilling at 7,168 ft. Monroe Township, Bedford County, John Galey 1 Donald H. Miller, is at 4,005 ft. Derry Township, Westmoreland County, Mid East Oil & Gas Co. 1 Frank Litvik, is drilling at 7,865 ft., Tully 7,180 ft. Onondaga 7,755 ft. and the chert at 7,765 ft.

OHIO

Ohio Fuel Co. 1 Mary Paxson, Section 17, Bearfield Township, Perry County, a wildcat started for the Clinton sand, found a pay gaging 6,500,000 cu. ft. in the Injun sand at 484-489 ft. The well has been turned into the line for testing.

Chartiers Oil Co. 1 Coshocton Broadcasting Section 10, Jackson Township, Coshocton County, the first offset to the discovery on 1 Yelvington, found only a small gas showing which increased to 260,000 cu. ft. after treatment. Clinton sand was logged at 3,760-3,781 and 3,792-3,822 ft.

Ohio Fuel Co. 1 Eyring, Lot 60, Grafton Township, Lorain County, an east extension

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of La Grange pool, found the Clinton at 2,506-2,516 ft. with an open flow of 1,000,000 cu. ft. after fracturing.

WEST VIRGINIA

Glate district, Webster County, West Virginia, Nelson W. Taylor, Agent, completed 1 Carpenter & Lucky wildcat, elevation 2,253 ft., with a large flow of gas gaging 4,066,000 cu. ft., Maxon sand 1,418 ft., gas 1,435-1,455 ft. This operator has announced location of 1 A. H. Swiger. Middle Fork district, Randolph County, Bobray Exploration Co. 2 Chester C. Housh, is shut down at 1,515 ft., with gas testing 188,000 cu. ft., in the Fifth sand. Washington Natural Gas Co., has located 3-5 E. S. Newlon heirs.

KENTUCKY

WESTERN KENTUCKY

Union County Discovery Tests Oil in McClosky

Ryan Oil Co. appears to have uncovered another McClosky producing area at its 1 Clements, wildcat test in 7-O-20, 2½ miles northeast of Morganfield, in Union County.

Testing is under way with pay perforated at 2,654-61 ft. No gage is available, but in a 2-hour drill-stem test prior to running casing, the well filled 1,190 ft. of clean oil with 380 ft. of salty mud-cut oil and salt water. The latter test took in an interval at 2,652-61 ft.

Location is 2 miles from nearest production.

EASTERN KENTUCKY

In Carter County and located in 23-W-76, a few miles north of Olive Hill, Procter et al., are shut down for orders at their 1 Polly Payne wildcat. Total depth is 640 ft. in Berea (Mississippian) sand topped at 533 ft. with no shows. Hole may be carried to the Corniferous lime.

In Greenup County, west of Oldtown, George Barnes is drilling at 380 ft. at the 1 Richard Cleary wildcat. Well is designed to test the Corniferous horizon.

INDIANA

Lamott Area Spreads

J. D. Turner 1 Marx, in the SW NE SE 25-7s-13w, ½ mile south of production in the Lamott area, 4 miles southeast of Mount Vernon, Posey County, recovered 170 ft. of clean oil in a 2-hour drill-stem test at 1,815-36 ft., in Waltersburg sand. The recovery was in addition to 60 ft. of drilling fluid, but no formation water was indicated. Casing has been run to the top of the pay. Bottom of the hole is still in sand.

ILLINOIS

Step-Out Well Produces

Illinois Mid-Continent Oil Co. has completed a ¾-mile step-out well in the Ellery area, 5 miles southwest of Albion, in Edwards County. The well, 1 Oscar Vincent, in the SE SE NE 31-2s-10e, pumped at the rate of 151 bbl. of oil per day from Aux Vases sand at 3,185-3,205 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

District 4

Duval County: American Liberty Oil Co. 2 Kirkpatrick, CCSD&RGNG Sur. 115, A-2020. Shut-in gas well, perforations 7,225-38 ft. TD 7,498 ft. (New field—North Lopez.)

Nueces County: George W. Graham 1 Dorsogna, Lot 11, Bishop's Subd., Petronilla Ranch. IP 5,100 M.c.f. daily with 25 BC per M.M.c.f., open flow, perforations 8,170-80 ft. TD 9,022 ft.

Starr County: Hawn Brothers 2 Hinojosa, Share 4, Porcion 109. Dry. TD 2,282 ft.

Webb County: O. W. Killam 1 Walker, BS&F Sur. 124. Dry. TD 2,360 ft.

Dillard & Waltermire 2 Marrs McLean estate, Section 2, J. H. Harvey Subd., El Javali Grant. Dry. TD 1,810 ft.

Zapata County: Hawn Brothers 2 Rodriguez, Share E, Charco Redondo Grant. Dry. TD 2,818 ft.

Miller & Pierce 2 Rodriguez, Share E, Charco Redondo Grant. Dry. TD 2,500 ft.

TEXAS GULF COAST

District 3

Brazoria County: C. H. Osmond and others 1 Bell, T. B. Bell Sur., A-41. Dry. TD 7,563 ft.

Chambers County: Placid Oil Co. 1 Barrow, John A. Burleson Sur., A-349. Dry. TD 9,915 ft.

San Juan Exploration Co. et al 1 Mayes heirs, John Johnson Sur., A-161. Dry. TD 8,276 ft.

Galveston County: Pan American Production Co. 1 Dollar Bay, S. F. Austin Sur., A-4. Dry. TD 12,014 ft.

Hardin County: Forest Oil Corp. 1 Kirby, Walker Pettis Sur., A-43. Dry. TD 10,908 ft.

Harris County: George S. Hammonds 1 Hegar, H&TC Sur. 33, A-447. Dry. TD 7,815 ft.

Rowan Oil Co. and others 2 Henry, J. M. Dement Sur., A-228. IP 79.86 BOPD, ⅛-in., 41.2°, perforations 7,071-74 ft. TD 8,305 ft. (New pay and first oil production in North Fairbanks field.)

Jefferson County: San Juan Exploration Co. et al. 1 Hebert, H. W. Smith Sur. 190, A-537. Dry. TD 11,143 ft.

Liberty County: Eddy Refining Co. 1 Swilley est., James Martin Sur., A-73. Dry. TD 12,022 ft.

Matagorda County: Group Oil Co. 1 Carlson et al. I&GN Sur. 2, A-336. (North Markham area). Dry. TD 9,013 ft.

Newton County: Panuco Oil Leases, Inc., et al. 1 Kirby, GC&SF Sur. 2, A-1206. IP 74.24 BOPD net, ¼-in., 43.7°, Cockfield 7,048-50 ft. and 7,053-55 ft. (perforations). TD 8,004 ft. (New field.)

Polk County: B. A. Glover 1 Cobb, George Jamison Sur., A-41. Dry. TD 3,825 ft.

EAST TEXAS

Anderson County: Sanders & Murchison 1 Magee, James Chappell Sur., A-171. Dry. TD 5,610 ft.

Cherokee County: George Frankel 1 Mayne, David Reynolds Sur., A-733. Dry. TD 5,100 ft.

Red River County: J. H. Dunn 1 Herrington, A. J. Latimer Sur., A-502. Dry. TD 1,400 ft.

TEXAS PANHANDLE

Gray County: Gulf Oil Corp. 1 Bell, Sec. 46, Blk. M2, H&GN Sur. Dry. TD 4,121 ft.

Roberts County: Glen McCarthy, Inc. 1 Wells-Strange, Clay County School Lands Sur. Dry. TD 3,827 ft.

WEST CENTRAL TEXAS

Callahan County: Clark & Cowden Production Co. 1 Farrar, Sec. 34, BBB&C Sur. Dry. TD 3,165 ft.

Daiches & Salam 1 Clinton, Sec. 12, BAL Sur. Dry. TD 1,701 ft.

W. L. Sibley 1 Cutbirth, 14-3-T&P. Dry. TD 2,969 ft.

O. B. Stephens et al 1 Fred Heyser, Sec. 24, BOA Sur. Dry. TD 800 ft.

Coleman County: Gilchrist Drilling Co. 1 Knox Ranch, Sec. 77, James Harris Sur. Dry. TD 3,454 ft.

Ray McLaughlin 1 Burkett, G. E. Harrison Sur. 235. Dry. TD 3,271 ft.

Homer Ogden & King Development Co. 1 Herring, W. E. Pritchard Sur. 122. Dry. TD 2,251 ft.

E. F. White, Jr. 1-B Harris, 25-1-GH&H. Dry. TD 2,890 ft.

Eastland County: Ernestine Callihan 1 Henderson, 10-1-H&TC. Dry. TD 3,280 ft.

Fisher County: Robert, King & Ford 1-A Willingham, 199-1-BBB&C Dry. TD 5,144 ft.

Haskell County: Clark & Cowden 1 McCleary, J. Conner Sur., A-97. Dry. TD 5,814 ft.

Jones County: Ungren & Frazier 5 Milstead, Subd. 5, Lge. 359, Goliad CSL. Dry. TD 3,020 ft.

Nolan County: Roark, Hooker, Hill and Signal Oil Co. 1 Boyd, 61-21-T&P. Dry. TD 6,200 ft. Elev. 2,148 ft., Ellenburger 6,162 ft.

Shackelford County: W. J. Rhodes 1 Nail-West, Sec. 150, ETRR Sur. Dry. TD 1,626 ft.

Stonewall County: James G. Brown 1 Callo-

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way, 59-F-H&TC. IP 452 BOPD, 16/64-in., 37°, GOR 300 cu. ft., TP 250 psi., Bend conglomerate pay 6,060 ft. TD 6,330 ft.

Cities Service Oil Co. 1 Flat Top, Sec. 124, BBB&C Sur. IPP 62 BOPD, 39°, GOR 162 cu. ft., pay 3,291 ft. TD 3,400 ft.

Taylor County: Bridwell Oil Co. 1 Camp, 50-1-SPRR. Dry. TD 2,630 ft.

Jimmie B. Curry 1 Dick, J. W. McDonald Sur. Dry. TD 2,634 ft.

NORTH TEXAS

Archer County: Archer Drilling & Production Co. 2 Goodwin, Blk. 133, J. W. Harris Subd. Dry. TD 1,155 ft.

R. M. Harmel 1 Harmel TE&L Sur. 2422, A-559. Dry. TD 1,500 ft.

W. A. Lofton 1-C Petrex, Blk. 114, ATNCL Sur. Dry. TD 1,540 ft.

Megargel Drilling Co. 1 Bishop, Blk. 10, Meade L. M. Pasture Subd. Dry. TD 1,497 ft.

James H. Snowden 1 Perkins, Sec. 14, J. Chisholm Sur. 18. IPP 45 BOPD, 30°, Gunsite lime 1,343-49 ft. TD 1,400 ft.

Baylor County: G&R Drilling Co. 1 Fails, TE&L Sur. 2453, A-473. Dry. TD 1,615 ft.

Mid-Continent Petroleum Corp. 1 Carpenter, 2-1-D&W Sur. IPP 24 BOPD, 34°, Cisco 1,441 ft., TD 1,446 ft.

Cooke County: Felderhoff Bros. Drilling Co. 1 Cox Lease, Wm. Brunck Sur., A-80. Dry. TD 4,410 ft.

Kay Kimbell 2 Williams, Blk. 85, Fannin CSL, A-1248. IPP 118 BOPD, 31°, GOR 200 cu. ft., Strawn 5,338-44 ft. TD 5,934 ft.

Fred Snuggs 1 Autry, John Fizer Sur., A-1361. Dry. TD 4,060 ft.

Jack County: L. T. Burns 1-A Edwards, Matthew Miller Sur., A-418. Dry. TD 4,028 ft.

Jack County Oil Co. 1 Webb, J. F. Middleton Sur., A-2125. Dry. TD 2,936 ft.

Taubert & Harper 1-A Graham, TE&L Sur. 2753, A-695. Dry. TD 4,650 ft.

Wilbarger County: Ted A. Norwood 1-L Waggoner, Sec. 40, MEP&P Sur. Dry. TD 2,501 ft.

Pat O'Neil 1-HH Waggoner, 7-4-H&TC. Dry. TD 2,422 ft.

Wise County: Miles Producing Co. 1 Blanton, 3-3-Cooke CSL. IP 128 BOPD, 16/64-in., 43°, TP 260 psi., GOR 1,200 cu. ft., perforated Atoka Bend conglomerate 5,810-22 ft. TD 6,110 ft.

Young County: Childress Drilling Co. 1 Willis, TE&L Sur., A-927. Dry. TD 4,061 ft.

C. H. Clarida 1 Norton Properties, TE&L Sur. 620. Dry. TD 565 ft.

William T. Roberts 1-H Jeffery, Blk. 475, TE&L Sur. Dry. TD 4,901 ft.

Turner, West & Riggs 1 Larrimore, TE&L Sur. 2247. IP 75 BOPD, 32/64-in., 42°, TP 100 psi., GOR 350 cu. ft., Strawn perforations 3,094-3,114 ft. TD 3,195 ft.

NORTHERN NEW MEXICO

McKinley County: Pure Oil Co. 1 Coyote Canyon, NW SW NE 29-19n-17w. Dry. TD 7,053 ft.

San Juan County: Benson & Montin 1 McManus, NW SE SE 30-26n-8w. 2,010 M.c.f. of gas per day, Pictured Cliffs discovery, new field. TD 2,091 ft.

Benson & Montin 1 Quitzau, SE NW NW 3-25n-8w. 1,175 M.c.f. of gas per day, Pictured Cliffs discovery, new field. TD 2,502 ft.

Bolack Oil & Gas-Benson & Montin 1 Sheets, NW SW SE 12-25n-8w. 1,055 M.c.f. of gas per day, Pictured Cliffs discovery, new field. TD 2,400 ft.

Twin Mounds area: Pubco Development 1 Russell-Federal, SE SE SW 4-29n-14w. 2,416 M.c.f. of gas per day, Mesaverde discovery, new field. TD 5,760 ft.

WEST TEXAS

Borden County: Phillips Petroleum Co. 1-B Clayton, 17-32-T&P. IPP 93 BOPD, 44°, GOR 832 cu. ft., reef pay 8,226 ft., perforated 8,736-44 ft. TD 8,251 ft. Elev. 2,572 ft.

Texas Crude Oil Co. 1-45 Brown, 45-33-T4N-T&P. IP 593 BOPD, 24/64-in., TP 200 psi., GOR 693 cu. ft., 38°, pay 7,442 ft., perforated to 7,555 ft. TD 8,210 ft. Elev. 2,758 ft.

Coke County: Vega Corp. et al 1 Weiser, 338-1A-H&TC. Dry. TD 6,733 ft.

Concho County: Luling Oil & Gas Co. 1-A Moore, Sec. 280, J. D. Pfannstiel Sur. Dry. TD 3,605 ft.

Crane County: T. M. Evans 1 Hord, 12-B22-PSL. Dry. TD 8,017 ft.

C. E. Marsh 1 Johnson-State, 2-B27-PSL, extension to Sand Hills-McKnight. IP 135 BOPD, 24/64-in., 33°, TP 125 psi., GOR 896 cu. ft., perforated 3,220-3,372 ft. TD 5,849 ft. Elev. 2,576 ft.

Crockett County: Cities Service Oil Co. 1-E Shannon, 18-Q-EL&RR. IP 1,685 BOPD, ¾-in., TP 550 psi., 48°, GOR 2,070 cu. ft., Strawn pay 8,099 ft. TD 8,210 ft. Elev. 2,862 ft.

Cities Service 1-AW University, 18-44-University lands. Dry. TD 9,300 ft. Elev. 2,716 ft., Strawn 8,985 ft., Ellenburger 9,120 ft.

Gaines County: Felmont Oil Co. 1 Terrell CSL, 15-309-Terrell CSL Sur. IP 1,678.8 BOPD, ¾-in., 36°, GOR 9 cu. ft., TP

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SYNTHETIC RUBBER SEAL
A FULL PIPE OPENING HORIZONTAL SWING CHECK VALVE
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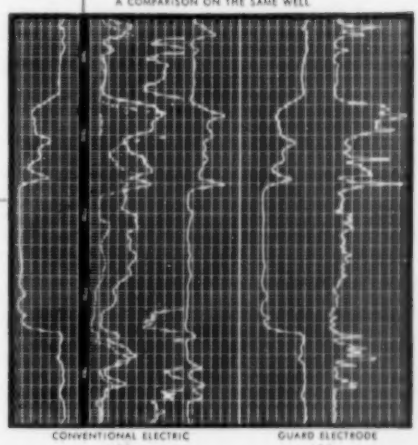

CONVENTIONAL ELECTRIC LOG

GUARD ELECTRODE LOG

by
GUARD ELECTRODE LOGS

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Even the elusive thin zones that conventional logs must "guess at" are now sharply defined by the new Halliburton Guard Electrode Log. The Guard Log easily obtains complete, more accurate responses from all beds for more exact studies of reservoir problems and correlation.

Halliburton's exclusive Guard Electrode Log completely eliminates the distorting factors known as reversals, lag, plateau area and shadow zones that are a result of spacing effects on multiple electrode systems. A single measuring electrode, located between two relatively long equipotential electrodes, limits response to only a zone approximately the same thickness as the length of the measuring electrode.

Current is forced out in a controlled or focused path which assumes the shape of a flat, thin disc normal to the axis of the bore hole. *All* the current from the resistivity measuring circuit flows horizontally into the formation opposite the exploring electrode—*without being influenced by variations in adjacent formations.* With this unique system, it is now possible to predict production in beds of critical thickness or in pay zones immediately under hard streaks or lignitic formations.

The controlled circuit of the Halliburton Guard Electrode also makes it possible to log in extremely saline fluids. Highly accurate resistivity measurements can be made in wells drilled with salt mud, particularly where the resistivity of the invaded zones is less than that of the zones not invaded.

The effectiveness of the Halliburton Guard Electrode system has been proved by actual core analysis and, more important, by production results. You'll find that Guard Electrode secures the vital information you require with so little down-time that it is a real economy. Get the complete details on Guard Electrode—the modern logging system. Call your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

ELECTRICAL WELL SERVICES

YEARS AHEAD IN PRODUCTION IMPROVEMENT TECHNIQUES

WILDCAT COMPLETIONS

80 psi., Devonian pay 12,672 ft. TD 12,785 ft. Elev. 3,130 ft.

Kent County: Arnold H. Bruner & Co. 1 York, 8-L-H&TC. Dry. TD 7,199 ft.

King County: Shell Oil Co. 1-E Burnett estate, 92-13-H&TC. Dry. TD 6,160 ft.

Midland County: Warren Petroleum Corp. 1 Wallin, 27-41-T3S-T&P. IP 671 BOPD, 48/64-in., 52°, GOR 1,015 cu. ft., TP 600-120 psi., Ellenburger pay 13,276 ft., perforated 13,280-13,310 ft. TD 13,424 ft.

Pecos County: Brown & Thorp Drilling Co. 1-4 Magnolia, 4-212-P. Morgan Sur. Dry. TD 3,221 ft.

Houston Oil Co. of Texas 1 Trees, 54-8-H&GN. Dry. TD 5,124 ft.

G. D. Putnam & Co. 1-D McDonald, 27-11-H&GN. Dry. TD 1,715 ft.

Runnels County: S. C. Herring Drilling Co. 1 Adams, Blk. 437, G. Hancock Sur. 473. Dry. TD 4,400 ft.

Schleicher County: Hunt Oil Co. 2 King, 8-K-GH&SA. Dry. TD 6,100 ft.

Taylor Oil & Gas Co. 1 Sheen Bros., Sec. 65, EL&RR Sur. IP 1,760 M.f.g., pay 4,418-37 ft., shut-in pressure 1,650 psi. TD 4,845 ft.

Tucker Drilling Co. 1 Boyd, 7-C-BS&F. Dry. TD 5,972 ft.

Scurry County: Fort Bend Oil Co. 1 Wade Davis, 98-3-H&GN. Dry. TD 8,005 ft.

Taylor Oil & Gas Co. 2 Winston Bros., Sec. 37, Tract 67, Kirkland & Fields Sur. IPP 71 BOPD, 38°, GOR 600 cu. ft., pay 7,220-30 ft. TD 7,240 ft.

Sterling County: J. P. Gibbins, Inc. 1 McEntire, 9-23-H&TC. Dry. TD 1,630 ft.

Dean & Hatch 1 McEntire, 5-T-T&P. Dry. TD 2,301 ft.

Sutton County: Western Drilling Co. 2 Wallace, 66-14-TW&NG. Dry. TD 5,112 ft.

Elev. 2,282 ft. estimated, Strawn 5,072 ft.

Tom Green County: J. W. McCutchen 1 Wilson, 7-16-H&TC. Dry. TD 1,070 ft.

Taylor Oil & Gas Co. 1 George Foster Rust, W. Hillyer Sur. 3. IPP 62 BOPD, pay 3,874 ft. TD 5,202 ft.

Texas Gulf Producing Co. 1 Johnson, H. Schumacker Sur. 99, A-1946. Dry. TD 6,400 ft. Elev. estimated 1,964 ft., Ellenburger 6,098 ft.

Upton County: Cities Service Oil Co. and Continental Oil Co. 1-AV University, 3-58-University lands, 3 miles E Rankin. Dry. TD 11,575 ft. Elev. 2,571 ft. estimated, Devonian 10,025 ft., Ellenburger 11,292 ft.

ILLINOIS

Clark County: J. W. Spencer 1 Newman, NE NE SW 20-12n-13w. Dry. TD 550 ft.

Crawford County: Big Four Oil & Gas Co. 1 Baker, NW SW NW 24-5n-14w. Dry. TD 2,780 ft.

S. J. Tucker 1 DeMent, SW NE NE 20-8n-11w. Dry. TD 1,410 ft.

Cumberland County: H. H. Ringer 2 Stewart, NW SW NW 2-9n-10e. Dry. TD 651 ft.

Effingham County: Frederking & Wageman 1 Lilly, SW NE NE 20-9n-4e. Dry. TD 1,865 ft.

Macon County: Davis Lambert 1 Towson, NE NW SW 24-15n-1e. Dry. TD 2,287 ft.

Washington County: Coy Oil Co. 1 Kozuzek, NE NW SE 33-3s-2w. Dry. TD 2,874 ft.

White County: F. L. Strickland 2 DeBoard, NE NW SE 28-6s-8e. Dry. TD 3,125 ft.

C. E. Brehm 1 Yates, SE NW SW 32-6s-8e. IPP 75 BOPD, Aux Vases 2,989-3,005 ft. TD 3,006 ft. Discovery of Norris City pool.

INDIANA

Clark County: Patton Oil Industries 1 Martain, NE NE NW 1-1s-5e. Dry. TD 1,918 ft.

Dubois County: J. C. Jones 1 Nilhaus, SW NW NE 29-3s-5e. Dry. TD 1,141 ft.

Gibson County: T & H Corp. 1 Mauck, NE NE NW 3-3s-12w. Dry. TD 2,593 ft.

KENTUCKY

Butler County: F. H. Rhoades 1 Martin, SE SW NW 2-J-33. IPP 28 BOPD, Benoist 1,429-40 ft. TD 1,440 ft. Discovery of Cromwell pool.

Henderson County: Slagter Production Co. 1 Blair Minerals, SE NW SE 12-Q-25. Dry. TD 2,275 ft.

Ohio County: H. E. Beane 1 Barnes, NE NW SW 16-K-34. Dry. TD 1,488 ft.

Union County: Slagter Production 1 Clemens, NE SE SE 6-O-20. Dry. TD 2,675 ft.

MICHIGAN

Allegan County: Orville Palmer 1 Hutchins, NW NE SW 4-2n-16w. IPP 25 BOPD after acid, Traverse lime 1,287 ft., pay 1,287-89 ft. TD 1,289 ft. (New pool.)

Bay County: Bell & Gault 1 Holey, NW NW SW 31-15n-3e. IP 6 BOPD Berea 2,360 ft. Pay 2,413-29 ft. TD 4,754 ft., PBTD 2,440 ft. (New pool.)

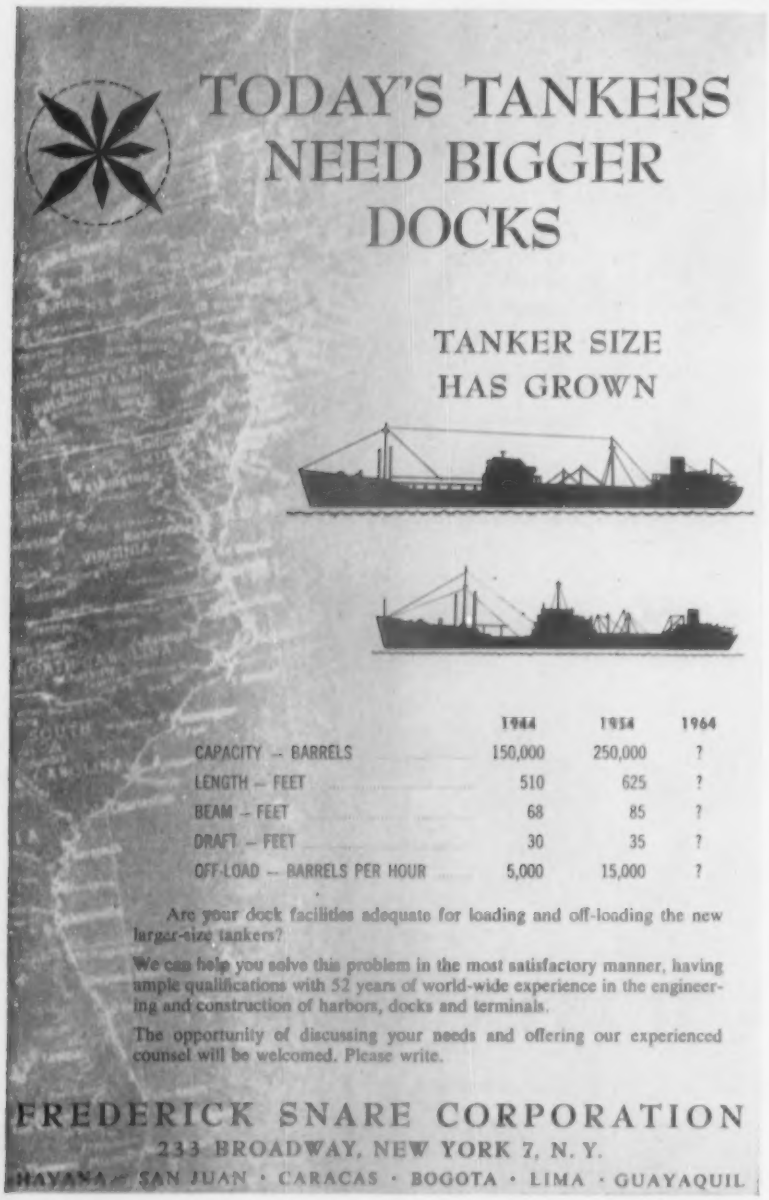
Genesee County: Wm. Kirk Swan 1 Baxter, NE NW NW 17-8n-5e. Dry. TD 1,650 ft. in Berea sand.

Gratiot County: McClure Oil Co. 1 Apple, NE NE NE 14-11n-4w. Dry. TD 2,675 ft. in Traverse lime.

Mason County: McClure Oil Co. 1 Johnson, NE NE SW 26-17n-15w. Dry. TD 1,990 ft. in Traverse lime.

Montcalm County: J. V. Wicklund, Jr., 1 Porter, NW SW NE 8-11n-7w. Dry. TD 3,492 ft. in Dundee-Reed City zone.

Ottawa County: Norman L. Stevens 1 Brummel, SW NE SW 27-5n-14w. Dry. TD 1,553 ft. in Traverse lime.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WILDCAT COMPLETIONS

WEST VIRGINIA

Webster County, Glade district: Nelson W. Taylor, agent 1 Carpenter & Lucky, elevation 2,253 ft., 4,066,000 cu. ft. gas, with 325 Psi., Maxon sand 1,418 ft., gas 1,435-1,455 ft., TD 1,455 ft.

ALABAMA

Monroe County: Sunnyland Contracting Co. and Sterrett Proctor 1 English, C SE NW 8-4n-5e. Dry. TD 5,700 ft.

Sunnyland Contracting Co. 1 Vredenburgh, C NE SW 10-9n-10e. Dry. TD 4,042 ft. Elev. 468 ft., Lower Cretaceous 3,770 ft.

Wilcox County: Gulf Refining Co. 1 Wilkinson, 17-13n-8e. Dry. TD 7,110 ft. Elev. 135 ft., Lower Cretaceous 2,503 ft., Smackover lime 4,807 ft., Triassic 5,802 ft.

MISSISSIPPI

Jefferson County: Calto Oil Co. and others 1 Walser, 25-8n-1w. IPP 84 BOPD net, 39°, Wilcox 5,587-89 ft. (perforations). TD 6,007 ft. Elev. 248 ft., Wilcox 3,894 ft., Artman sand 5,586 ft.

Jett Drilling Co. and others 1 Spencer, 78-9n-1w. Dry. TD 6,510 ft. Elev. 216 ft., Wilcox 3,769 ft., base Baker shale 5,646 ft.

Calto Oil and G. W. Gulmon 1 Truly-Huttenlocher unit, C E½ NE NE 25-8n-1e. Dry. TD 6,500 ft. Elev. 284 ft., Wilcox 3,871 ft., base Baker shale 5,760 ft.

Prentiss County: Huntington Minerals, Inc., 1 Taylor, NE NE NE 28-6s-9e. Dry. TD 2,850 ft.

Wilkinson County: B. Serio et al. 1 Ashley, 10-4n-1e. Dry. TD 6,999 ft. Elev. 167 ft., Wilcox 4,751 ft., base Baker shale 6,539 ft.

SOUTH LOUISIANA

Acadia Parish: H. L. Hawkins and Continental Oil Co. 1 Habetz, 37-10s-1e (¾ mile west of Crowley). Temporarily abandoned. TD 13,502 ft.

Calcasieu Parish: W. T. Burton 1 Bel et al, 13-11s-12w. Dry. TD 8,983 ft.

Cameron Parish: Pure Oil Co. 1-A State Lease 1634, Blk. 89, East Cameron area, Gulf of Mexico. Dry. TD 9,566 ft.

Iberia Parish: Continental Oil Co. 1 F. Williams, Inc., 28-12s-11e. Dry. TD 13,633 ft.

Iberville Parish: J. M. Flaitz and R. B. Mitchell 2 Wilbert, C SE NW 58-9s-11e. IP 144 BOPD, 10/64-in., 40.5°, perforations 12,848-92 ft. TD 12,822 ft. (New field.)

Regal Oil Co. 1 LeBlanc et al, 4-9s-1w (Sunshine area). Dry. TD 10,543 ft.

Lafourche Parish: Phillips Petroleum Co. 1 State Lease 1369, Blk. 5, Bay Marchand area, Gulf of Mexico. Dry. TD 2,358 ft.

St. Bernard Parish: Sun Oil Co. 1 State Lease 2424, Blk. 15, Breton Sound area. Dry. TD 9,500 ft.

The Texas Co. 2 State Lease 2219, Township 15s-17e, Lake Athanasio area. IP 57 BOPD, 7/64-in., 27.6°, perforations 6,702-80 ft. TD 9,510 ft.

Terrebonne Parish: Murmonill Corp. 1 Parche, 96-17s-17e. IP 8 BCPD and 1,797 M.c.f. daily, 12/64-in., perforations 10,068-74 ft. TD 13,262 ft. (Extends Hollywood field.)

NORTH LOUISIANA

Bossier Parish: Atlantic Refining Co. 1 Carter, 36-20n-14w. Dry. TD 9,630 ft.

Concordia Parish: Hunt Oil Co. et al 2 Faye Thomas, C SE NW 33-7n-7e. Dry. TD 6,203 ft.

R. A. Campbell B-1 Campbell-Harriss, 46-8n-9e. Dry. TD 6,010 ft.

ARKANSAS

Columbia County: Ed E. Hurley 1 Souter, C E½ SE 7-19s-22w. Dry. TD 6,275 ft.

Miller County: W & W Drilling Co. 1 Womack, C NE NE SE 29-14s-28w. Dry. TD 3,110 ft.

Nevada County: McAlester Fuel Co. A-2 E. E. Warmack estate, 9-14s-21w. Dry. TD 3,667 ft.

Ouachita County: Lawton Oil Corp. A-1 Elliott, C SW SE SE 14-15s-17w. Dry. TD 2,900 ft.

Union County: Pan Am Southern Corp. and Olin Oil & Gas Industries 2 Olin, C SE SE SE 26-18s-14w. IPF 102 BOPD, Glen Rose 3,492-3,500 ft., 20/64-in., 44.7°. TD 4,507 ft. (New pay in South Hillsboro field.)

OKLAHOMA

Beckham County: Falcon Seaboard-Sanders 1 Murphy, C NW SE 24-10n-24w. Dry. TD 1,306 ft.

Grant County: Kewanee Oil Co. 1 Holmes, NE NE NW 6-28n-6w. Dry. TD 5,438 ft.

Greer County: Bales and B.H.&C. Drilling Co. 1 Sells, E½ SE SE 5-7n-21w. IPP 5 BOPD, 1,134-1,244 ft., 36°. TD 1,444 ft. (Oil discovery.)

Kiowa County: Carter Oil Co. 1 Greb, SW NW NW 19-7n-16w. Dry. TD 1,740 ft.

Lincoln County: Woodward and Co. 1 Trawick, NE NE NE 26-16n-5e. IPP 20 BOPD, Skinner 3,367-73 ft., 41°. TD 3,600 ft. (Oil discovery.)

McClain County: Amerada Petroleum Corp.

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THE OIL AND GAS JOURNAL

"Mousey, if you didn't have such a small personality, I'd think it was split."

WILDCAT COMPLETIONS

Youngblood 1 Blevins, SW SW SW 17-5n-3e. Dry. TD 3,966 ft.

Murray County: David Beach, Trust 1 Littleton, SW SE NE 36-1n-2e. Dry. TD 1,002 ft.

Noble County: James R. Dees 1 Weigle, NW NE NE 25-24n-1e. Dry. TD 4,683 ft.

Oklahoma County: Webster Drilling Co. et al 1 McNew, C SE SW 14-11n-1w. IPF 240 BOPD, Miss. 6,109-18 ft., 39°, ¼-in. TD 6,681 ft. (Oil discovery.)

Republic Natural Gas Co. 1 McClelland, SE SE SE 29-11n-1e. IPF 50 BOPD, Hunton 5,845-51 ft., 35°, 30/64-in. TD 6,625 ft. (Oil discovery.)

Osage County: Sunray Oil Corp. 1 Osage, SE SE SE 9-25n-3e. Dry. TD 3,777 ft.

Sunray 1 Osage, SW SW SW 7-26n-10e. IPP 48 BOPD, Mississippi lime 2,012-20 ft. TD 2,021 ft. Geological wildcat—new pay in unnamed pool.

Pawnee County: J. C. Maxwell 1 State, SW NW SE 16-23n-5e. Dry. TD 3,626 ft.

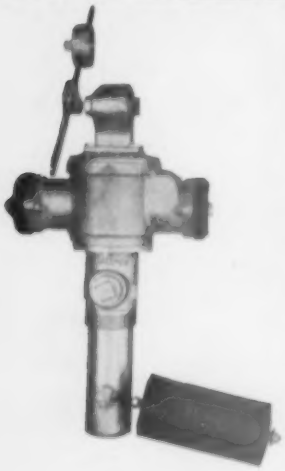
Payne County: Gulf Oil Corp. 1 Wirz, NW NW 31-18n-3e. Dry. TD 4,215 ft.

Pottawatomie County: Sun Oil Co. 1 Austin, NW NE SW 5-8n-2e. Dry. TD 5,990 ft.

Rogers County: Black Dot Oil Corp. 1 Hamilton, SW SE NE 18-22n-16e. Dry. TD 962 ft.

E. R. Cave and M. R. Edwards et al 1 Clinton, SE SE NE SW 21-23n-15e. Dry. TD 1,142 ft. 1 Flanagan, SW NW SE 21-23n-15e. Dry. TD 1,172 ft.

Tillman County: Union Oil Co. 1 of California 1 Zotigh, SE SE SE 27-4s-15w. Dry. TD 3,076 ft.



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KANSAS

Barber County: E. H. Adair 1 Allen, SE NW NW 4-33s-14w. Dry. TD 4,848 ft.

Barton County: Lee Phillips 1 Dahm, SW SW NE 9-20s-12w. Dry. TD 3,420 ft.

Edwards County: Natural Gas & Oil and Amerada 1 Fox, SW NW NE 35-24s-18w. Dry. TD 5,044 ft.

Ellis County: Transit Corp. 1 Orth, SE SE NW 3-14s-19w. Dry. TD 3,900 ft.

Graham County: Empire Drilling Co. 1 Zohner, SW SW SW 15-7s-24w. Dry. TD 4,399 ft.

Trans-Era 1 Hurlbut, NE NE SE 5-8s-25w. Dry. TD 4,535 ft.

C&G Drilling Co. 1 Gustafson, NE NE NE 7-9s-22w. Dry. TD 4,085 ft.

Hamilton County: United Producing Co. 1 Recktor, C SW NE 23-25s-40w. Dry. TD 5,543 ft. Miss. 5,349 ft.

Haskell County: Bennett & Roberts 1 Boatright, SE SE SE 13-29s-32w. Dry. TD 5,435 ft.

Kingman County: Aylward 1 Amsden, SW SW SW 11-29s-9w. IPP 265 BOPD, Viola 4,501-06 ft. TD 4,688 ft. (Opens Willow Dale pool.)

Meade County: Skelly Oil Co. 1 Gum, C NW SW 35-32s-29w. Dry. TD 5,867 ft.

Ness County: Wm. Gruenerwald 1 Everett, SE SE SE 2-18s-26w. Dry. TD 4,521 ft.

Norton County: United Drilling Co. 1 Horesky, SW SW SW 21-3s-23w. Dry. TD 3,764 ft.

Pawnee County: Natural Gas & Oil et al 1 Schartz-Weber, NE SE SW 26-21s-15w. Dry. TD 3,910 ft.

Coppinger at al 1 Martin, SW SW NE 12-23s-17w. Dry. TD 4,380 ft.

Phillips County: Sohio Petroleum Co. 1 Beckman, SE NE SE 36-3s-19w. Dry. TD 3,633 ft.

Pratt County: Cooperative Refining 1 Montgomery, NW NW NW 1-27s-12w. Dry. TD 4,560 ft.

Lario et al 1 Moore, SW SW SE 36-28s 14w. IPF 1,258 BOPD, Simpson 4,515-34 ft. TD 4,661 ft. (Opens Earl pool.)

Rooks County: Murfin Drilling Co. 1 McComb, NE NE SW 3-8s-17w. Dry. TD 3,435 ft.

Sumner County: Greenland Drilling Co. 1 Hills, NW NW SE 21-34s-2e. IPP 26 BOPD, Layton 2,829-37 ft. TD 3,538 ft. (Opens Padgett West pool.)

Woodson County: Chas. Davis 1 Rodgers, NW NW NW 25-26s-13e. Dry. TD 1,500 ft.

NEBRASKA

Banner County: Byrd Petroleum 1 Larson, NW NW NW 20-18n-53w. Dry. TD 5,747 ft.

Byrd 1 Williams, SW SW NW 25-18n-53w. Dry. TD 5,410 ft.

Cheyenne County: Rogers Oil Co. 1 Fastenow Bros., NW NW SW 17-13n-49w. Dry. TD 4,962 ft.

Kimball County: E. R. McElroy 1 Kelly, C SW SW 29-16n-55w. Dry. TD 6,415 ft.

Morrill County: Wytex Oil Co. 1 Marrin Estate, C SW SW 24-18n-50w. Dry. TD 4,380 ft.

SOUTH DAKOTA

Harding County: Stanolind Oil & Gas Co. 1 A. A. Clark-USA Unit, C NE NE 11-22n-2e. Dry. TD 9,304 ft. in Deadwood.

NORTH DAKOTA

Benson County: Shell Oil Co. 1 Jorgenson, NE SW 5-156n-68w. Dry. TD 2,650 ft. Devonian.

Wells County: Caroline Hunt Trust Estate 1

(Continued on page 180)

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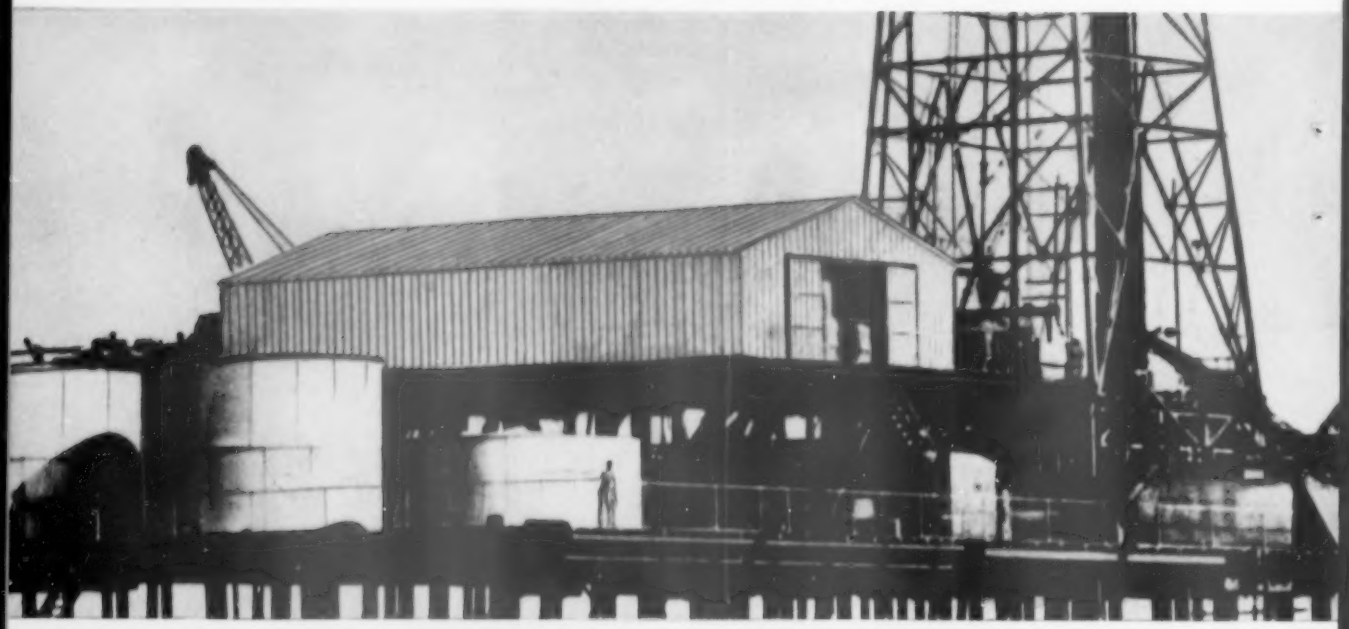

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Stratford Honored

Imperial's top scientist receives Canadian award

DR. REGINALD KILLMASTER STRATFORD believes that today's research chemist has a much tougher time making a substantial contribution to scientific progress than his brethren of 30 years ago.

Stratford, scientific advisor to Imperial Oil, Ltd., who has received the Chemical Institute of Canada's 1954 medal for his outstanding contribution to Canadian chemistry and chemical engineering, joined Imperial 30 years ago as a research chemist and headed the firm's research department from 1929 to 1951 when he was appointed to his present position.

The doctor, who has played such a prominent part in the development of chemistry in the oil business—he remembers when the best test of the consistency of grease was a dab by the greasemaker's thumb — believes that today's young scientists show a tendency to neglect the systematic work that has been the classical approach to all scientific progress. Stratford lays some of the blame for this negligence on the pressure of competition in manufacturing and getting the product ready for consumption.

Scientific bent . . . Stratford, whose bent for scientific knowledge goes back over 40 years, originally prepared for a career in agriculture. He attended Ontario Agricultural College at Guelph, Ont., where he was graduated in 1915. After working for 4 years as an agricultural representative in Ontario, he enrolled at Amherst Agricultural College in Massachusetts and received a master of science degree.

Pursuing the knowledge of science even further, Stratford began post graduate work at the University of Lyons in France. It was here that he became interested in petroleum and his thesis for his doctor's degree was on the cracking of pure hydrocarbons.

In 1924, he joined Imperial and began the career which 30 years later would see him having contributed research on 12 major projects and having taken out 26 patents.

One of his first achievements with Imperial was developing the use of phenol as a selective solvent for removing undesirable components from lubricating oils. This process was put into commercial operation in 1930 and is now used to produce nearly half of the world's lubricating oils.

Many successes . . . Stratford has also scored successes in the developing of asphalt for the construction of roads, the separation of waxes from lubricating oil distillates, and the development of the suspensoid catalytic cracking process.

These and other projects he has been connected with have brought him many awards and honors. In 1949 he received an honorary degree, Doctor of Science, from the University of Western Ontario, and in 1953 Queen's University of Kingston, Ont., conferred on him the honorary degree of Doctor of Laws. In February of this year he received the medal of the Society of Chemical Industry, Canadian section. This medal is awarded every 2 years for outstanding contributions to chemical affairs in Canada. His new award, the medal of the Chemical Institute, is awarded annually to an outstanding chemist or chemical engineer.

Stratford is a member of the permanent council of the World Petroleum Congress. In 1951 he was president of the Research Council of Ontario, and in 1952 chairman of the Canadian section of the Society of Chemical Industry. For 10 years he was a member of the Ontario cancer treatment and research foundation, and at present is on the advisory board of the Ontario Agricultural College.

Dr. Stratford was born in Brantford, Ont., and was married in 1922 to Phyllis Coate of Chatham, Ont. He has three children, two boys and a girl. In spite of the many professional demands on his time, he is an avid gardner, specializing in flower culture. He tries to grow flowers not normally found in the Canadian climate, such as English wall-flowers and primulas. One of his specialties is winter violets.

He collects records of operas and symphonies and is a past president of Sarnia Drama League. He was the first chairman of the Sarnia city planning board, the town in which he has worked during his 30 years with Imperial Oil.

Arch H. Hyden has retired as vice president and director of Skelly Oil Co. He had held this position since he joined Skelly in 1938.

Richard (Dick) Ebright, a geologist in the Pittsburgh, Pa., land and geological office of Carter Oil Co., has been transferred to Mattoon, Ill., tri-state headquarters for Carter.

D. S. SIMMONS

J. A. COGAN

Dwight S. Simmons has been appointed manager of the manufacturing department of Imperial Oil, Ltd., succeeding **G. L. Macpherson.** Succeeding Simmons as assistant general manager of manufacturing in charge of refinery planning and engineering will be **J. A. Cogan,** who recently resigned as manager of the coordination and petroleum economics department of Standard Oil Co. (N. J.).

Jay R. Endicott, Jr., formerly with Sunray Oil Corp. at Corpus Christi, Tex., has opened a division exploration and production office for Cosden Petroleum Corp. at Corpus Christi. He is new district geologist for Southwest Texas.

J. L. Gattenmeyer is now a corrosion engineer with Canadian Protective Coating, Ltd., located at Edmonton, Alta. He was formerly employed by Shell Oil Co., at Calgary, in a similar capacity.

George E. Crosby, division petroleum engineer with Continental Oil Co. at McAllen, Tex., has been promoted and transferred to San Antonio.

Jesse E. Buchanan, former president of the University of Idaho, is the new

PERSONALS

president of the Asphalt Institute. Buchanan succeeds **Bernard E. Gray,** who has retired.

Dr. Noyes D. Smith, director of Shell Development Co.'s exploration and production research laboratory in Houston, has been appointed a vice president of the company. Smith has been associated with Shell for 19 years.

T. S. Coggan, assistant fields manager of Basrah Petroleum Co., Ltd., operating in southern Iraq, has been appointed fields manager, succeeding **A. J. Perks. S. N. Nasr,** formerly the company's senior geologist, has been named assistant fields manager.

S. Caplowe, formerly assistant general refinery manager of Iraq Petroleum Co., Ltd., has been appointed general pipeline and terminal manager in Lebanon and Jordan. He succeeds **A. Hope Dickson,** who has retired from the company.

H. A. (Tex) Eddins, operating vice president of Laclede Gas Co., St. Louis, Mo., has been named executive vice president of the Oklahoma Natural Gas Co. at Tulsa, effective July 15. **P. K. (Doc) Wallace,** general superintendent of ONG for 2 years, will be promoted to operating vice president, succeeding **Herbert H. Ross** who has resigned effective August 1.

Sid Bonner, Jr., geologist with Magnolia Petroleum Co., has been transferred from Houston to Shreveport.

R. H. Trompeter, formerly with Gilliam Drilling Co. in Denver, has become a landman for Balderson Denver Drilling Co.

Gene Muller has resigned his position with Amerada Petroleum Corp. at Fort Morgan, Colo., to accept a position as landman with Pubco Development Co. at Denver.

Charles Mathews has resigned from the Billings, Mont., division of Carter Oil Co. to begin independent geological and land consulting. He had been associated with Carter for 7 years.

C. J. Hedlund has been named manager of the coordination and petroleum economics department of Standard Oil Co. (N. J.), effective August 1. In a related Standard development **C. L. Burrill** has been appointed chief economist, a new position to coordinate economic studies for the board of directors.

M. B. Heine, general purchasing agent of Phillips Petroleum Co., since 1948, has been promoted to manager of the purchasing department effective July 1. **J. W. Proffitt,** formerly assistant general purchasing agent, has succeeded Heine as general purchasing agent. These changes were effected upon the retirement of **Henry E. Koopman,** vice president in charge of the purchasing department since 1927.

Walter A. Sloan, of Oakland, Calif., regional treasurer of Tide Water Associated Oil Co., retired recently after 52 years of continuous service.

Richard A. Spurrier, geologist and director of the New Mexico Oil Conservation Commission for 9 years, has resigned effective July 16. He will be succeeded by **William B. Macey,** chief engineer of the commission.

William H. Thomas has succeeded **E. L. McDowd** as chief scout for Shell Oil Co. Thomas, who will maintain offices in Los Angeles, has been associated with Shell for more than 21 years, and has since 1941 been connected with the exploration department.

Howard P. Ferguson, manager of the Standard Oil Co. of Ohio No. 2 refinery in Cleveland, has been appointed manager of lubricating oil sales. Other changes at the No. 2 refinery include: **Richard H. Laird,** from plant superintendent to general superintendent, and **Ralph G. Atkinson,** from operations coordinator to assistant general superintendent.

Bob Mee, Shell Oil Co., was elected president recently of the Intermountain Oil Scouts Association at Salt Lake City. Other officers are **Howard Dennis,** Ohio Oil Co., vice president; **Joe Burnett,** Sun Oil Co., secretary; **Gene Luckenmeyer,** Continental Oil Co., treasurer, and **Myron Munson,** Carter Oil Co., editor.

Everett A. Jenkins has resigned as general superintendent for Skelly Oil Co. at Tulsa to join Three States Natural Gas Co. at Dallas as acting vice president and general production superintendent. Jenkins succeeds **Henry A. Harman** who retired recently and who will continue with Three States as a director.

O. V. Summers of Houston, superintendent of the Texas Pipe Line Co., communications division, retired June 30, ending a 40-year period of service with The Texas Co. Summers came to Houston in 1920 and supervised the rebuilding of Texaco communication facilities. He has been superintendent of the Texas Pipe Line communications division since 1937.

Houston Company Personnel Head For 'Land Down Under'

Eight members of the Robert H. Ray Co. of Houston board a clipper for Australia, where they will aid in development of new oil fields in Perth, West Australia. Left to right, front row: William Hazlewood, Austin, Tex.; James Holt, Texarkana, Ark.; Marion Hart, Jennings, La.; and Anders Thyssen, Danevang, Tex. Back row: Melvin Birkelbach, Georgetown, Tex.; James Gandre, Cost, Tex.; Charles Seagler, Palestine, Tex.; and Jack Cagle, Houston.

PERSONALS

William F. Penniman, who formerly represented Conorada Petroleum Corp. in Cairo, Egypt, will join the newly

W. F. PENNIMAN

J. S. ROYDS

formed Egyptian-American Oil Co. as assistant manager in charge of financial and governmental affairs. Other Egyptian - American appointments are **James S. Royds,** Rocky Mountain re-

R. BLAIR

D. B. EICHER

gion exploration manager for Continental Oil Co., as exploration manager; **Robert Blair,** division geologist in Salt Lake City for Conoco, as chief surface geologist; and **Don B. Eicher,** supervisor of exploration for Arabian-American Oil Co. in New York, as chief geologist. All will have headquarters in Cairo.

William H. Sanders, Jr., has been appointed southern district representative of the Rocky Mountain Oil & Gas Association. He will have charge of the Colorado - Nebraska territory for RMOGA, which includes the Denver-Julesburg basin.

Mervyn D. Steele, of St. Catharines, Ont., has taken charge of the Dominion Natural Gas Co.'s Fort Colborne area. He will continue to supervise the St. Catharines area.

Vernon J. Wilson has resigned effective June 29 as vice president of Skiles Oil Corp., to enter a partnership with **Joe McGuire** in the Mt. Carmel Drilling Co., Mt. Carmel, Ill.

E. J. Kaplow, formerly deputy supervisor for the California State Division of Oil and Gas at Santa Paula, has been appointed chief deputy at San Francisco. **S. H. Rock,** senior oil and gas engineer at Bakersfield, succeeds Kaplow at Santa Paula.

W. J. Michaelis, Jr., has succeeded **J. B. (Charlie) Adoue, Jr.,** as president of Trans Era Petroleum, Inc., of Wichita upon the latter's resignation.

Robert C. Read, formerly of New York City, has recently been elected vice president - secretary - treasurer of Skiles Oil Corp., Mt. Carmel, Ill. **Joe Schneider** has been promoted to assistant treasurer, and **Carol J. Waddle** to assistant secretary.

E. A. Wooden, superintendent of the engineering division of the Gas and Gas Products Department, Sinclair Oil & Gas Co., retired on June 30, after 37 years of service with Sinclair. He has been succeeded by **C. R. Childress.**

Larry Curtis, formerly Oklahoma district geologist at Oklahoma City for Sohio Petroleum Co., has resigned to join Kerr-McGee Oil Industries, Inc., as central division geologist. He has been replaced at Sohio by **L. H. Rogers,** who had been a division staff geologist in Oklahoma City.

Gerald Fisher has been appointed pollution control coordinator for General Petroleum Corp. A veteran of over 30 years with General Petroleum, Fisher has been manager of the lubricants and process products department since 1944.

Harry D. Page, general counsel of Amerada Petroleum Corp., has announced his resignation, effective August 31. On September 1 he will become a member of the legal department of Tide Water Associated Oil Co. in Tulsa. Page has been general counsel for Amerada since 1947.

M. Walter Wolf, The California Co., was elected president of the North Dakota Geological Society at the June 29 meeting. Other new officers are **Ray L. Harrison, Jr.,** Lion Oil Co., vice president; **Jack M. DeLong,** Sun Oil Co., secretary, and **John J. Magee,** Socony-Vacuum Oil Co., treasurer.

Lester C. Uren, professor of petroleum engineering at the University of California, has retired after 42 years of teaching. Professor Uren organized the university's first petroleum engineering curriculum in 1915 and developed model petroleum engineering courses.

Walter Moody, petroleum engineer with Seaboard Oil Co., has been transferred from Los Angeles to Denver.

John Janovy, who has been with Youngblood & Youngblood for several years, has resigned to become a consultant and independent operator in Oklahoma City.

Daniel C. Nufer has become associated with Arrow Drilling Co. in the capacity of exploration consultant. Nufer, recently affiliated with Absher and Booth, independent oil producers of Tulsa and San Antonio, began his geological work in 1924 with Carter Oil Co. in Tulsa, and has been in oil exploration work since that time.

A. T. Remington has been named district manager in Fort Worth for Mendota Oil Co., La Gorce Oil Co., and Granville Exploration Co. He was formerly connected with Pure Oil Co. in scouting and land work, and has recently resigned from a position with Hill & Hill.

DEATHS

F. Weldon Brigance, 56, executive vice president of the Rowan Drilling Co., and past president of the American Association of Oilwell Drilling Contractors, died recently in Fort Worth.

Robert B. Hollandsworth, 60, drilling contractor, independent oil operator, and co-owner of Hollandsworth & Nutting of Gainesville, Tex., died July 3 in Dallas.

Leil E. McVey, 48, of Long Beach, Calif., chemist with the Union Oil Co., died June 30 in a Hollywood hospital.

Caro A. Krebs, 65, former owner and manager of the Caro Krebs oil refinery in Los Angeles, died June 29 at his home in Whittier, Calif.

John G. Pew, 83, director of Sun Oil Co. and former president of Sun Shipbuilding & Drydock Co., died July 1 at his home in Rose Valley, Pa. Pew introduced at Sun Ship facilities for the manufacture of refinery equipment and was an expert in the natural-gas industry.

In its first year TCP...

the Greatest Gasoline Development in 31 Years... has re-powered 8 million engines

TCP, the shell discovered additive, blended into Shell Premium Gasoline, controls pre-ignition and spark plug fouling caused by lead and carbon deposits. Increases power up to 15% ... spark plug life up to 150%*

An entirely new gasoline, Shell Premium Gasoline with TCP, was first introduced to American motorists 12 months ago.

Because it overcomes the greatest cause of power and fuel loss affecting today's engines, it was hailed as the greatest fuel development since the introduction of tetraethyl lead in gasoline back in 1922.

In the first year following its announcement, Shell Premium with TCP has met with outstanding success. It has re-powered more than 8 million engines.

If you are not among the millions of motorists who are enjoying its benefits today, it will pay you to do so.

Shell Premium with TCP will increase the power of your engine up to 15%. It also prolongs the life of your spark plugs up to 150%.

Shell Premium with TCP is an exclusive development of Shell Research and is available at all Shell Dealer Stations.

*TCP: the unique gasoline additive discovered by Shell Research. Only Shell and its authorized licensee, Continental Oil Company, have the full knowledge of the proper use of TCP additive. Trademark owned and patent applied for by Shell Oil Company.

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SHELL PREMIUM GASOLINE *with TCP*

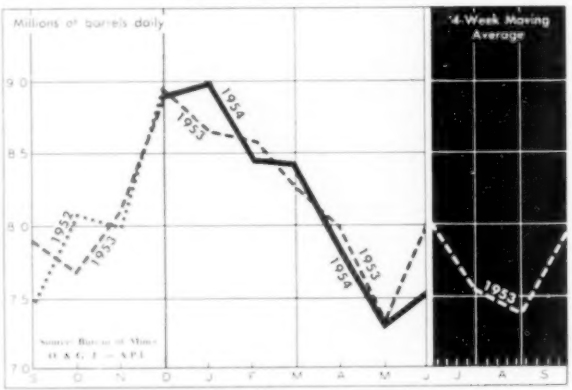
The most powerful gasoline your car can use

Latest Figures . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,378,975	DOWN	81,075	DOWN	158,102
Crude stocks	277,886,000	UP	213,000	DOWN	1,972,000
Completions	1,208	UP	222	UP	205
Refinery runs	7,005,000	UP	66,000	DOWN	48,000
Gasoline stocks	164,546,000	DOWN	3,488,000	UP	21,469,000
Four product stocks	329,898,000	UP	1,552,000	UP	28,867,000
Total imports	948,100	UP	14,600	UP	231,300

TOTAL DEMAND – ALL OILS



Gasoline Production Can Be Cut Through Either Runs or Yields

THE need for a reduction in gasoline inventories has become acute. In the past, most refiners have definitely established their summer gasoline supply programs by the first of July. At the end of June this year the excess of gasoline inventories over the same week of 1953 was even larger than at the start of the second quarter.

Stocks of finished and unfinished gasoline at the end of March amounted to 181,297,000 bbl. for a gain of 19,951,000 bbl. over the previous year. Total gasoline stocks on June 25 were 22,383,000 bbl. greater than a year earlier. Part of the poor comparison was due to the fact that jobbers and retailers were expecting a price increase in the last half of June 1953 and made large purchases before the end of the month.

However, these excess purchases probably did not account for more than the 2,400,000-bbl. net gain in the past 3 months. This indicates that nothing has been accomplished on the problem of working off some of the excess gasoline in storage.

Need for cut in July . . . Secondary suppliers and jobbers build gasoline inventories early in the season and, by the middle of July they have started on the program of replacing any surplus secondary gasoline stocks with heating oils. Also, primary suppliers start building up stocks of heating oils at pipeline terminals. In normal years these changes take place in the third quarter with most of the reduction in gasoline stocks completed by the end of August.

Suppliers need to cut gasoline stocks by an extra 20,000,000 bbl. in the next 3 months. Some refiners have suggested a reduction in percentage yields of about two points.

Cuts based on yields . . . With refinery runs averaging about 7,000,000 bbl. daily, a cut of two points in percentage yields of gasoline would lower gasoline production by about 140,000 bbl. daily. Assuming that recent yields would be high enough to meet summer demands with normal stock reductions, the extra cut of 140,000 bbl. daily could be used to work off part of the current excess in primary storage.

However, it will take about 140 days at this rate to work off the extra 20,000,000 bbl. or until about the middle of November.

Cuts based on runs . . . To accomplish the same reduction of an extra 140,000 bbl. daily through lower refinery runs would mean a cut of more than 300,000 bbl. daily in crude input.

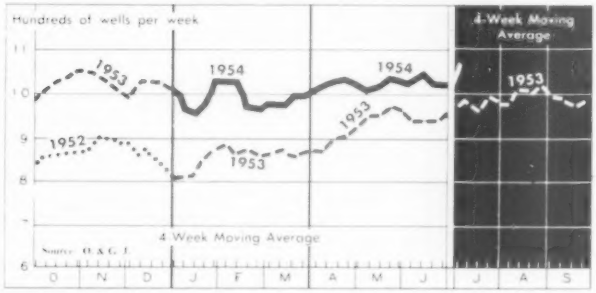
Some other refiners believe that it will take a cut in both runs and gasoline yields to do the job.

Markets . . . Grade 26-70 natural gasoline dropped 0.5 cent a gallon on the North Texas market, effective July 3. Group 3 was still holding at 4.5 cents on July 7.

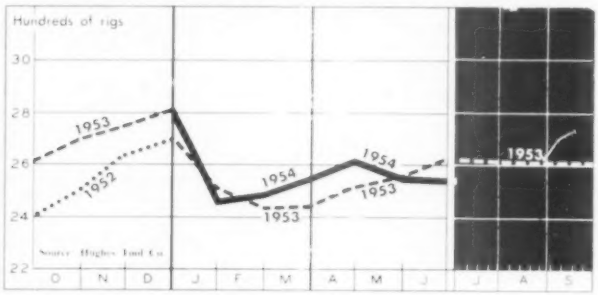
Most Group 3 gasoline is moving at prices that are unchanged from a week ago, but some material is down to compete with barge material on the river.

The low of regular-grade gasoline on the Gulf Coast is down 0.25 cent from formal postings.

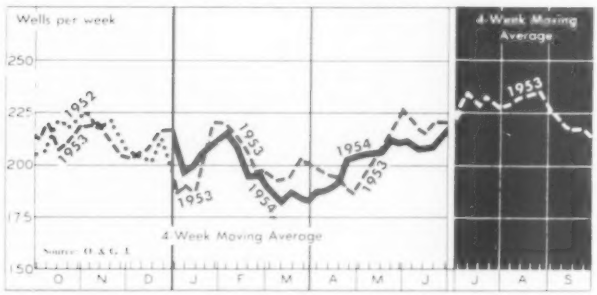
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS

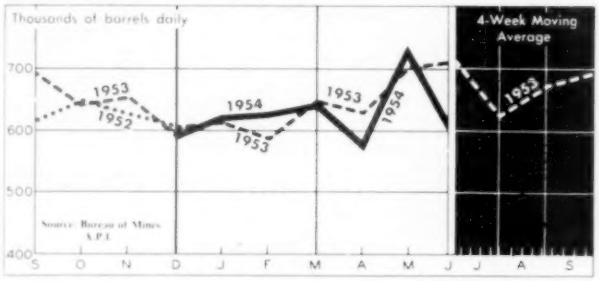
Area—	7-5-54	Change from 6-28-54	Change from 7-6-53
Gulf Coast	534	3	— 58
N. and W. Texas-New Mexico	826	31	— 13
Arkansas-N. Louisiana-E. Texas	176	4	17
Oklahoma	291	—20	— 51
Kansas-S. Nebraska	173	— 3	— 3
Illinois-Eastern	147	8	— 1
Rocky Mountain	252	12	— 17
Pacific Coast	130	— 6	— 40
Total United States	2,529	29	—166
Western Canada	140	25	— 16

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 3, 1954

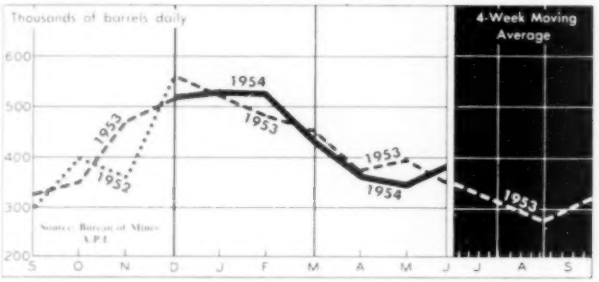
	Total of all wells: Comp.	Oil	Gas	Dry	Footage	Cum. 1954	Cum. 1953	Wildcat completions and discoveries: Oil	Dist.	Gas	Dry	Total	Cumulative total, 1954: Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	3	0	0	3	16,852	56	69	0	0	0	3	3	2	0	2	46	50
Arkansas	19	11	0	8	73,603	326	232	1	0	0	4	5	16	0	4	54	74
California	37	29	0	8	140,065	1,245	1,307	1	0	0	8	9	38	1	7	269	315
Colorado	37	10	2	25	204,990	667	289	0	0	1	13	14	20	0	9	249	278
Illinois	58	30	0	28	143,925	1,391	887	1	0	0	8	9	6	0	0	209	215
Indiana	12	6	0	6	19,899	393	610	0	0	0	3	3	5	0	0	82	87
Kansas	129	64	12	*53	455,766	2,289	2,515	3	0	0	18	21	41	0	9	299	349
Kentucky	32	10	13	9	64,488	577	522	1	0	2	3	6	11	0	3	58	72
Louisiana	72	44	8	20	403,744	1,707	1,299	2	1	0	10	13	53	33	15	151	252
North	43	32	5	6	116,362	939	529	0	0	0	3	3	5	3	6	61	75
South	29	12	3	14	287,382	768	770	2	1	0	7	10	48	30	9	90	177
Michigan	14	5	0	9	40,018	284	271	2	0	0	5	7	10	0	0	116	126
Mississippi	15	7	0	8	97,070	206	185	1	0	0	5	6	5	0	0	74	79
Montana	5	4	0	1	9,975	144	196	0	0	0	0	0	2	0	1	38	41
Nebraska	8	3	0	5	44,918	181	162	0	0	0	5	5	11	0	3	59	73
New Mexico	20	9	9	2	97,979	521	683	0	0	4	1	5	10	0	10	61	81
North Dakota	7	4	0	3	45,789	130	132	0	0	0	2	2	3	0	0	44	47
Ohio	22	12	6	†4	43,746	583	520	0	0	0	0	0	3	0	4	9	16
Oklahoma	213	127	8	‡78	702,721	4,704	3,671	5	0	0	14	19	66	2	14	311	393
Pennsylvania-New York	42	13	10	§19	72,000	1,223	1,189	0	0	0	0	0	0	0	5	19	24
Texas	409	247	24	138	1,807,142	9,298	8,781	20	1	5	85	111	397	42	87	2,114	2,640
Southwest (1 & 4)	60	36	4	20	226,182	1,317	1,435	2	1	1	13	17	66	21	25	359	471
Gulf Coast (2 & 3)	54	25	9	20	368,605	1,379	1,299	3	0	3	16	22	41	16	25	338	420
East (5 & 6)	22	8	7	7	111,128	483	417	0	0	0	3	3	8	0	7	137	152
North Central (7-B & 9)	145	82	0	63	412,234	3,462	3,294	7	0	0	31	38	162	4	12	863	1,041
West (7-C & 8)	111	84	2	25	634,662	2,168	1,921	8	0	1	20	29	119	0	13	372	504
Panhandle (10)	17	12	2	3	54,331	489	415	0	0	0	2	2	1	1	5	45	52
Utah	1	0	0	1	3,805	33	38	0	0	0	1	1	2	0	1	18	21
West Virginia	10	3	5	2	23,928	270	303	0	0	1	0	1	0	0	15	7	22
Wyoming	41	32	0	9	220,107	710	326	2	0	0	4	6	27	0	3	97	127
Miscellaneous (S. D.)	2	1	0	1	18,024	82	31	0	0	0	1	1	2	0	0	14	16
Total United States	**1,208**	671	97	440	4,750,554	27,020	24,218	39	2	13	193	**247**	730	78	192	4,398	5,398
Total previous week	986	530	111	345	4,185,251			35	4	16	160	215	691	76	179	4,205	5,151
Total July 4, 1953	1,003	531	85	387	3,949,491			39	3	10	181	233	729	55	194	4,499	5,477

Service wells included: *1, †2, ‡5, §16.

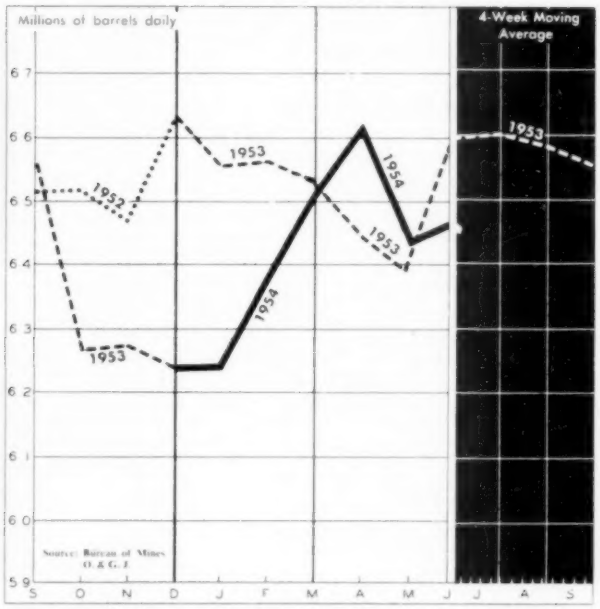
CRUDE IMPORTS



PRODUCT IMPORTS



CRUDE-OIL PRODUCTION

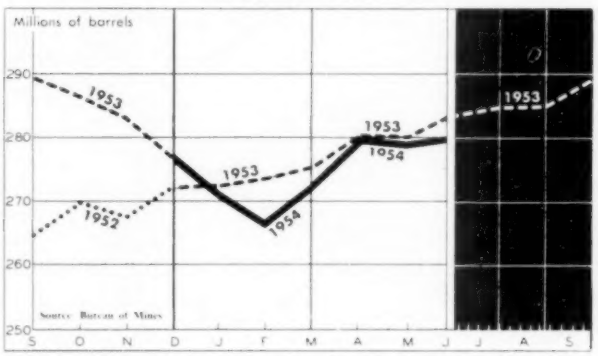


DAILY AVERAGE PRODUCTION FOR WEEK

	July 3			June 26
	Crude oil	Lease condensate	Total	total
Alabama	4,300		4,300	4,400
Arkansas	77,500	500	78,000	78,000
California	988,900		988,900	988,900
Colorado	125,300		125,300	124,700
Eastern	55,000		55,000	55,000
Florida	1,625		1,625	1,650
Illinois	188,000		188,000	191,400
Indiana	29,400		29,400	29,800
Kansas	320,600		320,600	333,300
Kentucky	36,600		36,600	37,500
Louisiana	658,350	33,900	692,250	710,650
North	111,200	3,400	114,600	112,650
South	547,150	30,500	577,650	598,000
Michigan	34,700		34,700	34,100
Mississippi	88,850	2,050	90,900	92,500
Montana	36,200		36,200	38,100
Nebraska	18,700		18,700	18,900
New Mexico	204,800	1,075	205,875	206,950
Oklahoma	482,000		482,000	480,000
Texas	2,681,925	45,500	2,727,425	2,775,500
Dist. 1	42,925	350	43,275	44,100
Dist. 2	139,700	5,550	145,250	150,600
Dist. 3	428,850	23,100	451,950	459,050
Dist. 4	243,525	5,200	248,725	253,850
Dist. 5	44,775	350	45,125	46,150
Dist. 6	112,275	4,700	116,975	119,200
East Texas field	230,850		230,850	236,000
Dist 7-B	119,225	25	119,250	119,325
Dist. 7-C	182,000	4,300	186,300	190,200
Dist. 8	868,500	1,700	870,200	883,600
Dist. 9	188,725	200	188,925	193,400
Dist. 10	80,575	25	80,600	80,025
Utah	5,400		5,400	5,100
Wyoming	243,400		243,400	238,900
North Dakota	14,400		14,400	14,700
Total U. S.	6,295,950	83,025	**6,378,975**	6,460,050
Change from previous week, down			**81,075**	
Canada	289,400		†289,400	†289,400
Total U. S. production January 1-July 3			1,183,002,125 bbl.	
Same period last year (crude plus cond.)			*1,198,349,351 bbl.	

*Incl. 17,044,400 bbl. cond. †Week ended previous Monday.

CRUDE-OIL STOCKS



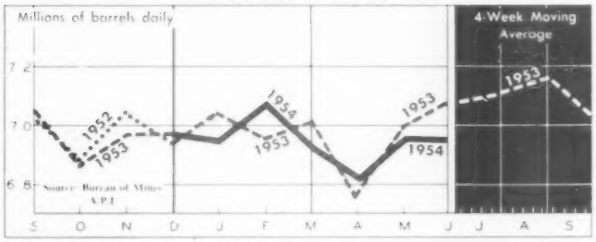
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

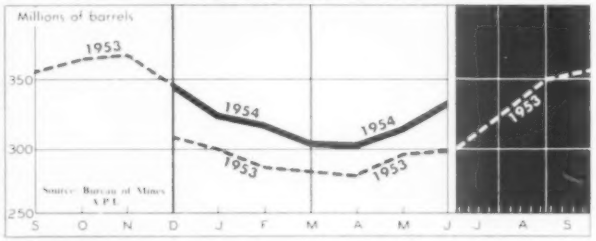
	June 26, '54	June 19, '54	June 27, '53
Pennsylvania Grade	3,286	3,283	2,705
Other Appalachian	1,856	1,842	2,226
Illinois, Indiana, Michigan	13,043	12,666	11,924
Kansas	9,723	9,685	9,320
Oklahoma	27,203	27,218	29,944
Arkansas	3,373	3,395	2,727
Louisiana	16,406	16,113	15,385
North	2,423	2,384	2,504
Gulf	13,983	13,729	12,881
Mississippi	3,047	3,123	3,826
New Mexico	7,473	7,170	7,246
Texas	130,311	130,366	133,399
East Texas proper	12,144	12,056	11,440
West Texas	55,550	55,559	61,890
Texas Gulf	29,062	29,383	26,692
Other Texas	33,555	33,368	33,377
Wyoming	13,553	13,110	13,527
Other Rocky Mountain	4,442	4,740	3,129
California	32,469	32,459	33,127
Foreign	†11,701	12,503	11,373
Total	277,886	277,673	279,858

*Bureau of Mines. †Includes 2,530,000 bbl. in California.

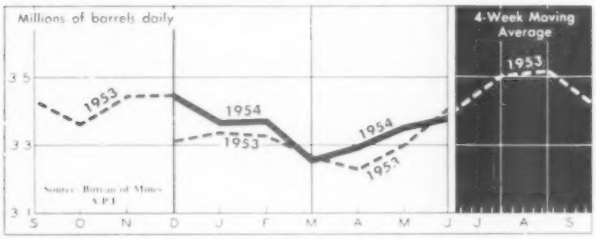
REFINERY RUNS



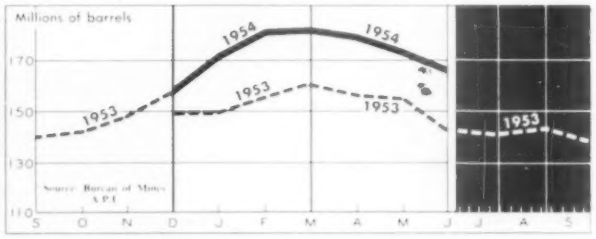
FOUR-PRODUCT STOCKS



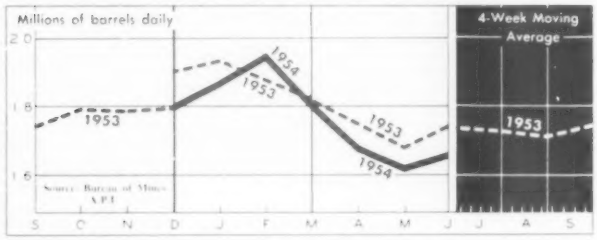
GASOLINE PRODUCTION



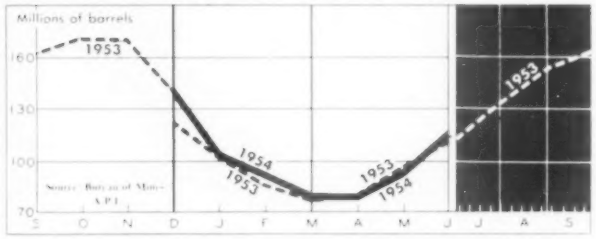
GASOLINE STOCKS



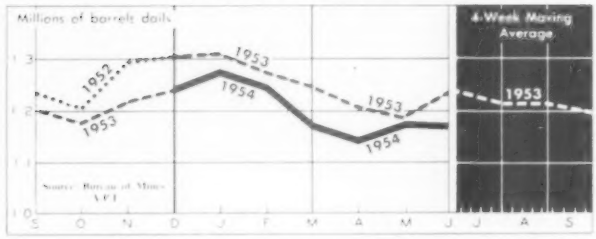
MIDDLE-DISTILLATE PRODUCTION



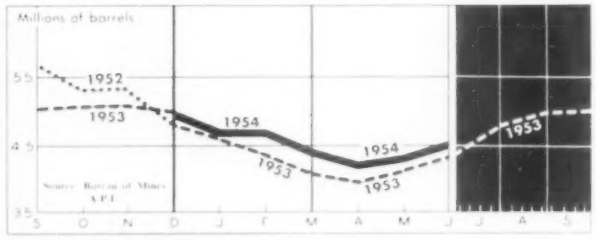
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



(A.P.I. data not available in time to extend lines on cuts.)

A.P.I. REFINERY REPORT, JULY 2

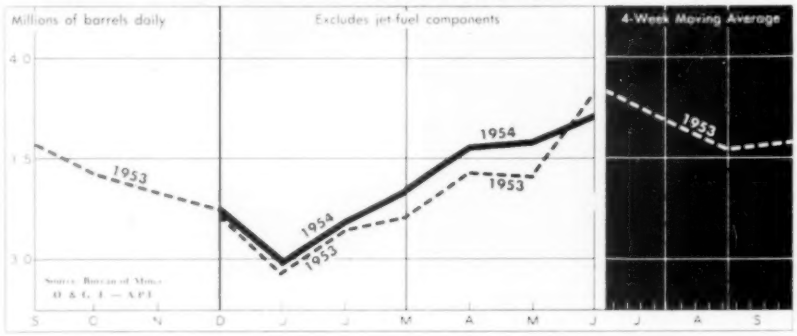
(Excludes all jet-fuel components)

(Thousands of barrels)

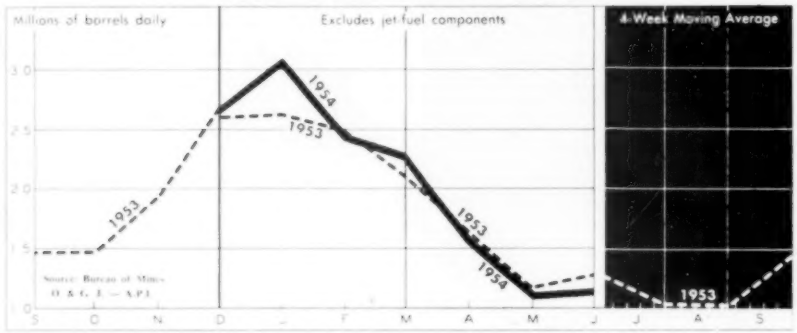
District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, July 1953—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,009	434.9	31.9	273.7	195.3	36,847	11,614	28,551	9,905	1,101	455.9	30.8	264.5	240.8
Appalachian:														
District 1	105	49.3	8.6	19.9	13.3	4,261	423	1,500	527	108	46.4	3.9	19.4	13.3
District 2	92	49.6	5.1	14.1	7.1	2,588	425	666	332	93	51.4	6.0	10.2	13.4
Ind., Ill., Ky.	1,302	688.4	72.0	232.0	163.4	36,736	6,229	16,638	4,616	1,295	717.2	72.1	205.3	162.7
Okla., Kans., Mo.	621	354.0	15.9	129.6	41.7	17,012	1,618	9,698	1,375	632	369.5	16.9	153.4	51.8
Inland Texas	256	180.6	10.4	46.7	25.9	6,431	393	1,612	1,282	263	189.4	10.8	46.2	35.3
Texas Gulf Coast	1,637	790.8	105.1	372.3	227.0	19,609	3,270	9,327	4,757	1,624	837.5	119.0	369.8	229.7
La. Gulf Coast	585	266.6	60.9	142.6	59.7	8,773	2,435	4,311	1,388	572	297.9	47.9	138.9	58.5
N. La. and Ark.	87	37.3	8.4	18.1	5.0	3,563	838	921	132	83	33.7	6.2	20.0	6.7
Rocky Mountain:														
New Mexico	19	12.0	1.0	2.9	2.7	232		71	29	20	12.8	.4	3.7	3.3
Other Rocky Mtn.	252	123.4	3.3	57.6	39.3	8,063	254	2,177	848	242	115.1	1.7	53.4	38.8
California	1,040	425.7	2.7	138.7	386.2	20,431	443	11,293	25,454	1,070	456.2	5.1	156.6	369.6
July 2, 1954	7,005	3,412.6	325.3	1,448.2	1,166.6	164,546	27,942	86,765	50,645	7,103	3,583.0	320.8	1,441.4	1,223.9
June 25, 1954	6,939	3,408.9	299.3	1,385.7	1,124.9	168,147	26,937	83,013	50,362					
June 4, 1953	7,053	3,367.2	316.4	1,478.7	1,265.7	143,077	27,387	85,829	44,738					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

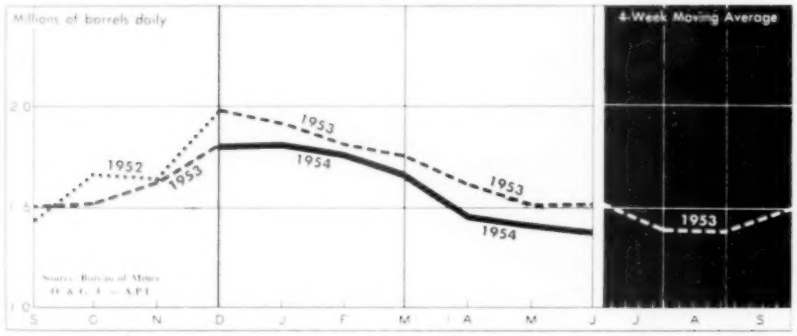
TOTAL GASOLINE DEMAND



TOTAL MIDDLE-DISTILLATE DEMAND



TOTAL RESIDUAL DEMAND



(A.P.I. data not available in time to extend lines on curves.)

REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of July 7, 1954. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.5-11	11.5-12.25	9.75-10.25
Premium gasoline	11.5-12	13.25-14	11-11.5
42-44 w.w. kerosine	9-9.25	9.70-9.95	8.75-9
No. 2 straw fuel oil	8.125-8.25	8.70-8.95	7.75-8
No. 6 residual	$1.00-1.10	$2.15-2.30	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4.5	3.5	4.25
Grade 18-55	5.4	4.4	5.15

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	13.25

WAX

Mid-Continent

132-134 A.M.P.	6.0

● Suppliers report that movement of gasoline out of primary terminals was very good in the week before July 4, but markets continued weak with plenty of semidistress material available. Most spot prices are down from last year.

PRODUCTION AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 7-2-54	3,367	3,823
April 1954	3,298	3,547
March 1954	3,261	3,331
June 1953	3,410	3,838
Middle distillate:		
Four weeks ended 7-2-54	1,686	1,169
April 1954	1,696	1,598
March 1954	1,811	2,240
June 1953	1,747	1,280
Residual fuel:		
Four weeks ended 7-2-54	1,163	1,325
April 1954	1,141	1,486
March 1954	1,169	1,667
June 1953	1,238	1,506

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	....	2.76	3.09	2.63
34-34.9	....	2.78	3.11	2.65
35-35.9	....	2.80	3.13	2.67
36-36.9	....	2.82	3.15	2.69
37-37.9	....	2.84	3.17	2.71
38-38.9	....	2.86	3.19	2.73
39-39.9	....	2.88	3.21	2.75
40 and above	....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

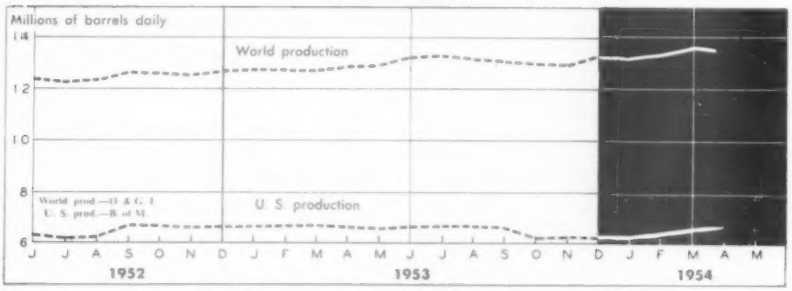
Prices east of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective May 20, 1954.

FLAT CRUDE PRICES

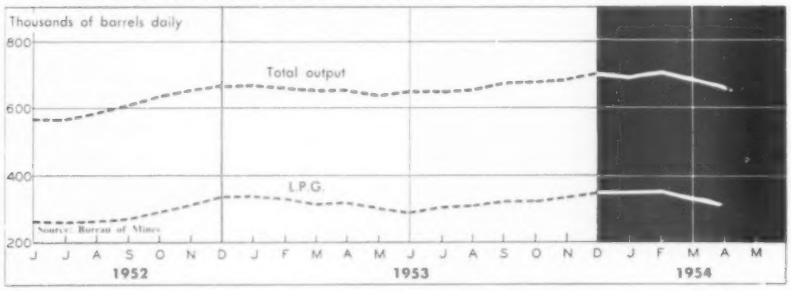
Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.00-3.26
Middle District	2.20
Southwest Pennsylvania	2.81
West Virginia	2.75
Ohio	2.74
Illinois Basin	3.02

CRUDE-OIL PRODUCTION



NATURAL-GASOLINE AND CYCLING-PLANT PRODUCTION



CRUDE PRODUCTION

(Thousands of barrels daily)

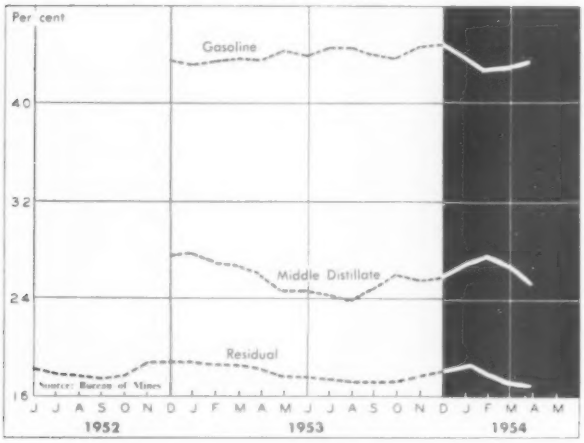
Month—	U. S.	World
April 1954	6,615	13,606
March 1954	6,507	13,680
February 1954	6,379	13,365
September 1953	6,557	13,157
April 1953	6,446	12,964

PRODUCTION AT NATURAL-GASOLINE AND CYCLING PLANTS

(Thousands of barrels daily)

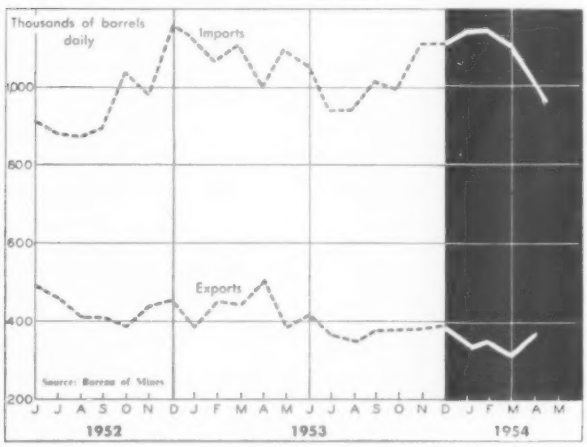
Month—	L.P.G.	Total
April 1954	313	661
March 1954	332	682
February 1954	356	705
September 1953	317	674
April 1953	312	651

REFINERY YIELDS

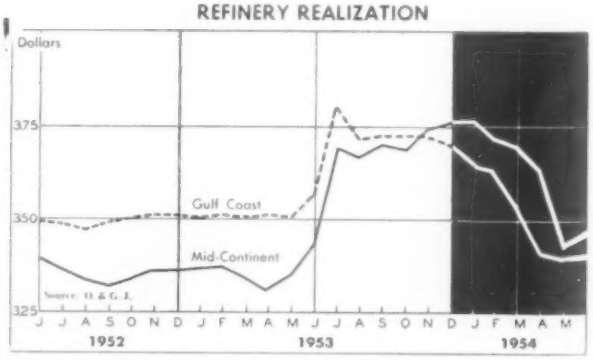


JET-FUEL PRODUCTION

IMPORTS-EXPORTS



REFINERY REALIZATION



REFINERY REALIZATION

	June 1954	May 1954	April 1954	June 1953
Mid-Continent	$3.44	$3.41	$3.58	$3.43
Gulf Coast	3.39	3.39	3.50	3.57

Refinery realization is based on yields of major products and average spot prices for regular gasoline, kerosine, No. 2 fuel, and residual as published in The Oil and Gas Journal.

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FOR SALE EQUIPMENT

WILSON GIANT—Serial No. 6383. Sales Price—$6,000. Equipped with Two Waukesha 145 GK Engines in good condition. General Appearance—Fair. Rig used for Work-Over. Price includes Kelco Spinning and Foster Breakout Catheads; Stromberg - McCreary Air Starters on Engines. Brakes circulating water-cooled; Manual Friction Clutches in Transmission; Others — Jaw Clutches. Rig has Slush Pump Drive and Rotary Drive. Location of Unit—Lake Charles, Louisiana. Contact Cardwell, Houston.

FOR SALE. New S-33 Walker-Neer Spudder. Drilled one 1600' well. All tools from 12½" down through 4", trucks, trailer, new lines, long bits and bailers. This is a complete outfit ready to rig up and drill. Morrison Drilling Co., Box 7146, Tulsa. Office phone 7-0559. Home 7-5767. Denny Morrison.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

SHOT HOLE CASING—Approx. 6,000' of new 3" O.D. x 10' long 16 gauge threaded shot hole casing. 22 cents per foot f.o.b. Tulsa, Oklahoma. Don R. Hinderliter, Inc., P. O. Box 1864, Tulsa 1, Oklahoma.

WILSON TITAN, San Juan Basin, 2-LRO Waukesha, 131' Emsco Mast, 10' Sub-structure, 7¾ x 16 Pump, 6000' 4½" D.P., 10 Drill Collars, Blowout Preventer, see on job. P. O. Box 1826, Wichita Falls, Texas.

FOR SALE—Eighty thousand bbl. Wiggins Pontoon Floating Roof Tank. Chicago Bridge make API all welded 5 rings 120' x 40', located Illinois. Priced to sell. Ph. 3-6141, W. C. Berry, P. O. Box 1858, Tulsa.

PLANT LIQUIDATION

TOWERS AND COLUMNS

1—8' O.D. x 61' 6" SS, 15 trays 50#, 300° F.
1—7' 6" O.D. x 55' 6" steel, 30 trays 45#, 300° F.
1—7' I.D. x 42' steel, 20 trays 40#, 150° F.
1—7' I.D. x 25' 6" SS, 10 trays, 50#, 250° F.
1—6' I.D. x 64' steel, 35 trays, 55#, 300° F.
1—6' I.D. x 45' SS, 15 trays, 850#, 350° F.
1—5' O.D. x 61' 6" steel, 15 trays, 55#, 300° F.
1—4' O.D. x 72' SS, 40 trays, 75#, 300° F.
1—3' 6" I.D. x 64' steel, 35 trays, 55#, 250° F.
1—2' 6" I.D. x 60' steel, 35 trays, 55#, 300° F.
1—2' O.D. x 75' steel, 45 trays, 55#, 300° F.
1—2' I.D. x 39' SS, 40 trays, 70#, 300° F.

HEAT EXCHANGERS-CONDENSERS

2—1440 sq. ft. 304 S.S. 75# PSIG, 350° F.
4—1345 sq. ft. steel, 70# PSIG, 300° F.
2—1125 sq. ft. steel, 850# PSIG, 900° F.
9—Kettle type reboilers, steel & SS, 1250, 1125, 750, 660, 400 & 340 sq. ft.
58—Atmospheric heat exchanger units, 304 stainless steel, 715, 477, 358 & 108 sq. ft.

OTHER ITEMS

Complete oxygen plant, 170 T/Day.
Two Clark gas engine—800 BHP, Rt. Angle Comp.
Two Clark gas engines—150 BHP, Rt. Angle Comp.
Partial list only—Circular on Request.

BRILL EQUIPMENT COMPANY
1101 San Jacinto St., Houston 4, Texas, Justin 6032
Sell us your surplus equipment

FOR SALE EQUIPMENT

ONE MAYHEW 600 Drill and 800-gallon water truck both mounted on 1953 F-600 V-8 Fords. 200 ft. new drill pipe and all hand tools. All equipment in excellent condition. Buford Miller, Box 100, Phone 1222-W, Guthrie, Oklahoma.

TWO MODEL K Cardwell Spudders, fully equipped, excellent condition, operating in tri-state area. For further information write Box H-263, The Oil and Gas Journal, Tulsa, Oklahoma.

WILSON GIANT, San Juan Basin, with 2-V12 Le Roi, 131' L. C. Moore, Sub-structure, Blowout Preventer, 7¼ x 14 Pump, 5000' 4½" D.P., 10 Drill Collars, complete ready to run. P. O. Box 1826, Wichita Falls, Texas.

ONE PORTABLE RIG, capable of 1000 foot with 4½ inch drill pipe. Powered with D318 Caterpillar, 2400 hours actual. Approximately 800 foot 4½ inch drill pipe. 41 foot hydraulic lift derrick. Tandem truck with winch. IHC water truck. C. H. W. Drilling Co., Elkhart, Kansas.

FOR SALE
8" LINE PIPE

250,000'—8⅝" O.D. 28.55#
Lapweld

All used #1 grade, machine cleaned, straight, 20' single random lengths, ends beveled. Suitable installation, oil, water, or gas pipeline systems 850 to 900# PSI. Large additional quantities same size in process, taking up and reconditioning. Priced attractively, prompt shipment. Carrollton, Mo.

Write, Wire, Phone

HUMBOLDT-CHICAGO PIPELINE PROJECT
125 W. 3rd St. Tulsa, Okla.
Phones 2-9128—54-4229

FOR SALE EQUIPMENT

FOR SALE: Model "K" Cardwell tubing and rod unit complete with tubing and rod tools, mast, mounted on Ford tandem truck. Melco Drilling Company, Seminole, Oklahoma.

FRANKS ETS-500—Single Drum Hoist Less Engine. Sales Price—$1,500. General Appearance — Good. Unit complete with Franks Power Take-Off; Mounted on Steel and Wood Truck Bed. Location of Unit—Winfield, Kansas. Contact Cardwell, Wichita.

FRANKS MODEL 5000 Spudder — Serial No. 866. Sales Price—$7,500. Equipped with one Cummins HB1-600 Engine in good condition. Brake Rims in fair condition; Brake blocks—Good. General appearance—Good. Chains—Good. Basic Machine equipped with Spudding attachment, Skid and 65' Double Leg Pipe Mast with 8⅝" and 7" Pipe Legs; 4-Sheave Crown of Wilson Manufacture. Price includes Mast Guy Lines. Location of Unit — Western Kansas. Contact Cardwell, Wichita.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.
H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

Ton and one-half Chevrolet truck, low mileage. Special built aluminum body, 3000 watt fully automatic light plant, 180 gallon water tank, automatic water pump.

Royal Spartanette trailer like brand new. Stop anywhere, hook hose from truck to trailer and plug in lights for city convenience.

Light plant runs off main gasoline tank, has fuel pump. Fill water tank any filling station. Two Butane gas tanks for cooking. Water heated by Electric plant.

Out of this world for out of the way living or for Sportsman, Hunter or Fisherman.
Norvell-Wilder Supply Company
P. O. Box 2178, Houston, Texas
Telephone ATwood-3471.

FOR SALE
INGERSOLL-RAND
GAS ENGINE DRIVEN COMPRESSORS

1—	XVG-8	—350 H.P.
1—	XVG-6	—250 H.P.
1—	XVG-4	—150 H.P.

ANY COMBINATION COMPRESSOR CYLINDERS.
SPECIFY INLET AND DISCHARGE PRESSURES.
PROMPT DELIVERIES.

EARL E. KNOX COMPANY
TELEPHONE: 2-5204
BACON STREET, ERIE, PA.

FOR SALE EQUIPMENT

BRAND NEW 6x4x6 Worthington Duplex Steam Pumps, $410.00 each. FOB Houston. Subject to Prior Sale. Halloran Equipment Co., 5702 Harvey Wilson Drive, Houston 20, Texas.

THREE #12 Sweetland Filters, 48 bronze leaves, monel covered, on 3" C.C., now located in southwest, available for inspection. 11 Sperry 18" x 18" cast iron Filter presses, 11 chambers. Consolidated Products Co. Inc. #65 Garden Street, Hoboken, N. J. N. Y. Tel.: BArclay 7-0600.

FOR SALE—Late Model 36-L Bucyrus-Erie complete with casing strut, auxiliary leg, necessary casing tools, Steel dog house with 6 lockers, Kohler light plant, tool float, 5", 6" and 8" tools complete, 70 bbl. swab tank, 5" and 6" Burt and Guiberson swabs, 1950 ¾ ton Chevrolet Pickup. All in first class shape. Call or write A. F. Johnston or D. W. Palmitier, Box 1820, Pampa, Texas, phone 4-6981.

WILSON ATLAS. Sales Price—$21,000.00. Equipped with two L1-600 Cummins Diesel Engines in good condition: includes pump drive, 12 PD groove sheave and V-belts. One American cathead and one plain spool cathead. Compound enclosed oil-bath. Includes one 1000 gal. fuel tank. Contact Cardwell, Houston.

GASOLINE PLANT *FOR SALE*

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Adequate storage tanks for all products. Drum Lead Blending Plant. Detailed inventory available upon request.

SOUTHERN PRODUCTION CO., INC.
P. O. Box 670, Ft. Worth, Texas

FOR SALE
8" SURFACE CASING

10,000'—8⅝" O.D.

28.55# Lapweld

20' single random lengths, 8 V threads and couplings, used good condition. Priced attractively, Prompt Shipment, Grandview, Mo.

Write, Wire, Phone

Humboldt-Chicago
PIPELINE PROJECT

125 W. 3rd St., Tulsa, Oklahoma

Phones 2-9128—54-4229

FOR SALE EQUIPMENT

4—10,000 bbl. bolted steel tanks, 55' dia x 24' ht. 1—1550 Gaso pump, size 5 x 10. 2—1550 Gaso pumps, size 2½—5 x 10. 3—Caterpillar diesel power units, No. D 4600. Clark Oil & Refining Corp., P. O. Box 297, Blue Island, Illinois. Tel. WAterfall 8-5200. Attn.:—H. Beck.

FOR SALE: 5700 ft. 4½ Used Drill Pipe. Excellent condition for shallow drilling. Located east of Norman. Randall R. Morton Drilling Co. Tulsa, Oklahoma. 5-6609.

WILSON SUPER, San Juan Basin, 87' Mast Pole, Substructure, 3000' 4½" D.P., 6 Drill Collars, 7¼ x 12 Pump, complete rig. P. O. Box 1826, Wichita Falls, Texas.

FOR SALE: ENGINE—165 Hp. Climax Model R61, maximum continuous Hp. rating 126. Herndon Drilling Company, 421 Mayo Building, Tulsa. Phone 4-9700.

70,000' NEW BLACK PIPE, ½", ¾", 1½" 2" G.V. & GLOBE. R. E. Kershaw, Surplus, 306 S. 4th, Muskogee, Oklahoma.

10,000 ft. 6" OD 12# seam. x 16 22 ft. No. 1 @ 55c ft. 10,000 ft. 4" 11# T & C line No. 2 @ 52c ft. 1500 ft. 20" OD 5/16" No. 1 x 16 22 ft. @ 2.25 ft. Moritz Company, Braddock, Pa.

FOR SALE: 10% Discount. 1 New 3½" BJ "MAA" DP Elevator, 1—4½" ditto, 1—4½" "AA" ditto. Arrow Supply Co. 6-3552. Box 2649, Odessa, Texas.

FOR SALE—General Motors Mod-3031-C Diesel Engine complete with clutch and Brown-Lipe 6241 Transmission. Used-good condition $1250.00 F.O.B. Wichita Falls. Lin-Mour Drilling Company, 1220 Oil & Gas Building, Wichita Falls, Texas.

FOR SALE: 66 Wichita Spudder, Tools, 6 cyl. LeRoi Engine, Dog Houses, Truck, ready to go. E. N. Brock, 2717 Hilltop Dr. Odessa, Texas.

1—18 foot Tandem Low Boy Trailer—$1750.00. 1—New 1500 Gallon Tank Trailer—Single Axle Dual Wheels, with Non-directional tires—$500.00. 6—International 6 x 6 Army Trucks with Hard Cabs. 1,000 feet of New 4½" Galvanized 11# line pipe—$1.00 per foot. 1—Complete Portable Rig, Capacity—2500 ft. This Rig has only drilled 8,000 feet of hole. Has 2,000 feet of New 2⅞" I.F. drill pipe. 1—International Bus, made into dog house, light plant, subs, everything ready to drill. This rig comparable to a Failing 2500. Box H-280, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL DRILLING EQUIPMENT. New and used spudders, rotaries, core drills. Tools, pipe, cable. Everything for well drilling. Fishing tools rented. Pressey & Son, Pueblo, Colo.

EQUIPMENT WANTED

WANTED: 5000 foot double drum drawworks with or without motors. Write P. O. Box 3246, Corpus Christi, Texas.

WILL TRADE Steam Drilling Rig complete, less drill pipe, capable of drilling to 11,000 feet for Steel Deck Barge 175' long by 44' wide by 11' deep. Bateman Drilling Company, 601 The Texas Company Bldg., New Orleans 16, Louisiana.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

MATERIAL WANTED

One 13⅝" Shaffer Blowout Preventer, Type 39. One 10¾" Shaffer Blowout Preventer, Type 39.

MAKIN DRILLING COMPANY
P.O. Box 1628
Hobbs, New Mexico

FIRE FIGHTING SERVICE

OIL WELL FIRE FIGHTER—THE BEST

Specially Trained Under the Late Tex Thornton

TED E. FERRIN and O. E. "CHOCK" BROOME

Phone 1392-J1 or 1044-W-1, P. O. Box 642
Drumright, Oklahoma

Work in Any Field in the World

HELP WANTED

CHEMICAL OR REFINERY Engineers—For permanent staff positions with integrated oil company which manufactures all important petroleum products. Duties involve advisory work on operations, preparation of operating programs, processes and economic evaluations. Knowledge of gasoline and lube manufacture desirable. Excellent future for engineers with one or more years experience. Salaries commensurate with ability and experience. List training, experience and personal data in first letter. Replies confidential. Box H-276, The Oil and Gas Journal, Tulsa, Oklahoma.

EXCELLENT opportunity with a Midwest Engineering Company for young engineer with B.S. in Chemical Engineering or equivalent. Would participate in new tray design and development with opportunity to enter sales. General experience in fractionation and absorption design desirable. Box H-225, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER for midwest refinery with 3-5 years experience in estimating, mechanical design and piping. Oil refinery experience preferred. Reply should include resume of experience, education, references, and salary expected. Box H-274, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM OR RESERVOIR ENGINEER

With minimum 3 years experience in development, production and oil and gas reservoir engineering on primary and secondary recovery problems. For New York office of major foreign producer.

MICROPALEONTOLOGIST

Preferably with an advanced degree and a minimum of 5 years' commercial or academic experience. To work in New York research laboratory. This position demands broad interests in Stratigraphy and Biofacies and the capacity to do independent work on projects assigned.

Salary for above positions dependent on experience and qualifications. Write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ-11

Arabian American Oil Company

505 Park Avenue

New York 22, N. Y.

CHIEF ENGINEER

Well known national engineering and construction company specializing in oil and chemical industries. Must have thorough knowledge petroleum processes and proven ability to organize and handle complete engineering department. Age preference 35-45. Headquarters Middle West. Give complete data first letter. Box H-277, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

CHEMICAL ENGINEER for midwest concern with 2-5 years experience in refining operations. Prefer man with some background in economics. Reply should include resume of experience, education, references and salary expected. Box H-275, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER
Petroleum manufacturing, northwest location, regular entering position, company benefit plans, with or without petroleum refining experience, college transcript and a detailed work record required. Box H-266, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

DUE TO EXPANSION program large independent oil company has openings for assistants in seismic recording and computing. College graduates with at least one year of experience in geophysics desired. Ample opportunity for advancement. Give educational and previous employment details in initial letter and include photograph. All replies confidential. Box H-265, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED, Manufacturers representative with good following among independent and major producers and pipe line companies, to represent the new Carbro Fuel Generator which minimizes fuel costs on pumping wells and pipe line stations. Liberal commissions. Open territories. Please give details of present lines and sales area coverage. Box 487, Wichita, Kansas.

Refinery Manager

West Coast integrated oil company has opening for manager of refining.

This is an outstanding opportunity for a capable man with experience in modern refinery processing, organization, and for other phases of refinery management. The company is a long established and progressive one with an excellent record of earnings.

Write, giving full personal history and outline of experience. All replies will be held confidential.

Box H-272

The Oil and Gas Journal

Tulsa, Oklahoma

WANTED PARTNER

Graduate Petroleum Engineer or Geologist familiar with shallow production, cable tools and rotary. Independent producer offers exceptional opportunity to purchase ½ interest in well established oil business for inventory prices, in rigs, pipe, production etc. Ideal situation for young aggressive man to join older geologist in money making shallow area. State education and experience. Amount required at inventory prices for ½ interest $225,000.00. No information by mail. Will arrange personal interview at Chicago, Illinois. Box H-268, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

REFINERY ENGINEERS
needed in
SOUTH AMERICA

Attractive staff positions are available with affiliates of Standard Oil Company (N. J.) for qualified experienced technical graduates.

MECHANICAL ENGINEERS — must be thoroughly qualified and experienced design of refinery or chemical plant equipment including piping, pressure vessels, heat exchangers.

CHEMICAL ENGINEERS—assignments in process engineering will include economic studies and preparation of refinery operating programs.

Write giving age, education, marital status, and details of previous experience.

Box 308-U
Radio City Station
New York 19, N. Y.

SITUATIONS WANTED

YOUNG MAN . . . Excellent educational background, 4 years petroleum analyst Wall St. Willing to learn anything with oil company in Los Angeles. Box H-257, The Oil and Gas Journal.

CHEMIST, M.S., 5½ years experience operating Sulfur, Girbotol, Gasoline Plants. Laboratory organization. Desires relocation. Box H-262, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 34, married, 7 years varied experience in Gulf Coast, Rocky Mountains, and Permian Basin with large Independent. Desires to re-establish in Louisiana Gulf Coast with aggressive Independent. Box H-270, The Oil and Gas Journal, Tulsa, Oklahoma.

FIELD SUPERINTENDENT: 37, Married, B.S. degree. In charge of drilling, production, maintenance of our family-owned properties in Penn Grade region past 9 years. Commercial pilot of light planes since 1942. Box H-241, The Oil and Gas Journal, Tulsa, Oklahoma.

SUPERVISING Pipeline Accountant. Seven years experience with crude-products pipeline operators. Can organize, manage, and handle all administrative detail. Familiar with all Federal accounting requirements. Box H-259, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM ENGINEER, 34, married, 9 years part time in supervisory capacity, diversified drilling, production, remedial, and reservoir experience in Gulf Coast. Presently employed. Desire position with opportunity for advancement. Box H-279, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 31, degree, married, presently employed, five years major company experience in South Texas and Gulf Coast. Desires change. Will relocate. Box H-278, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER—Master's, 4 years refinery engineering experience, one year's research on determining ocean wave forces for the U. of Calif. Box H-273, The Oil and Gas Journal, Tulsa, Oklahoma.

Well organized, well established oilwell drilling contractor desires the management and supervision of oil properties in West Texas, Central Texas, and New Mexico. Can provide complete handling of oil properties, from acquisition to production. No properties too small, and none too large to handle. Inquiries from independents, groups, small or medium sized oil companies invited. Write, wire, or call collect for further information.

MAKIN DRILLING COMPANY
P. O. Box 1628, Hobbs, New Mexico,
Phone 3-3141.

146 Allen Building, Midland, Texas,
Phone 2-2962.

SITUATIONS WANTED

DRILLER. Experience, 17 years in production and drilling. Any department. Age 37. Absolutely sober. George Markin, 3301 North McKinley, Oklahoma City 18, Oklahoma. Phone Jackson 8-5464.

GRADUATE PETROLEUM Engineer—10 years diversified drilling, production, completions, workovers, well tests, gas measurement, subsurface geology, reserve estimates, proration, and surveying. Two Schlumberger logging schools. Now employed. Sound references available. Box H-282, The Oil and Gas Journal, Tulsa, Oklahoma.

SR. DRAFTSMAN: Mapping, structural, geological and allied drafting; desires Texas location. Box H-271, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS SERVICE

Delaware Corporations formed and serviced, American Guaranty & Trust Company, P. O. Box 487, Wilmington, Delaware.

ROYALTIES

$50,000.00 FOR FORMULAS plus Royalties. Business too big for present ownership. Additives, Laboratory tested and proven for smog and monoxide fume elimination. Box H-281, The Oil and Gas Journal, Tulsa, Oklahoma.

JACK EAGLE, Oil Properties, 706 City Nat'l Bldg., Oklahoma City, Oklahoma. Telephone REgent 6-7027.

LEASE AND DRILLING BLOCKS

FOR SALE: 6 Blocks—from 320 to 2820 acres—Harding County, New Mexico—$3.00 per acre—all blocks neighboring each other—can be bought as one drilling block—consists of approximately 9200 acres. J. J. Enkich, 2318 No. Greenview, Chicago, Ill.

SEE A. L. BOWLES, Box 947, Ada, Okla., for drilling deals and producing royalties if you have the cash for Oil Investments.

WILL pay cash instantly for lease (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

WANTED—Lease blocks anywhere. Submit description, geology and terms. Box H-188, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Coffey County, Kansas, 120 Acre Lease. Well completed, all new equipment. Box 35, Iola, Kansas, for detailed information.

LOOKING TOWARD CANADA FOR BETTER OPPORTUNITIES?

Alberta offers larger blocks, better deals, exciting new producing horizons, new markets. Leases, reservations (20,000 to 100,000 acres), drilling deals and farmouts arranged by one of Alberta's most successful operators.

Box H-205, The Oil and Gas Journal, Tulsa, Oklahoma

IMPORTANT WELL TO DRILL ROCKY MOUNTAIN AREA

Contract calls for drilling by Aug. 15, testing multiple prod.; zones to east. Oil men & investors who appreciate great potential values furnished technical data gratis.

W. J. Peterman, Geologist
Exploration (1918-1954) Engineering
Portales New Mexico

OIL WELL FOR SALE

At Duck Lake, Michigan

R. L. PATTINSON

Aylmer, Ontario

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

ELECTRIC LOG CABINETS

FOR ECONOMICAL FILING of full-size electric logs, most geologists prefer Kraftbilt E-24 4-drawer Electric Log Cabinet. Two compartments to each drawer with separate follow-blocks make this cabinet handy, economical. For filing reduced electric logs, geologists use Kraftbilt E-28 8-drawer cabinet. Send for Catalog 352-B. Ross-Martin Co. P.O. Box 800-A, Tulsa, Okla.

MONEY RAISING

YOUR FINANCING PROBLEM can most probably be solved. Inquiries invited. Box H-220, The Oil and Gas Journal, Tulsa, Oklahoma.

STRIP LOG CABINETS

MORE LOGS ARE FILED in Kraftbilt Strip Log Cabinets than all others combined! Loaded drawers glide smoothly on roller bearings. Three drawers to section—add sections as needed. Built to last a lifetime! Send for Catalog 352-B. Ross-Martin Co. P. O. Box 800-A, Tulsa 1, Okla.

REAL ESTATE

RANCHES—1,000 to 19,000 acres. Some will pay 3 to 7% on investment. Smaller acreage also. Few choice sites near Kerrville. Write: Street Hamilton, 117 Main St., Kerrville, Texas.

FOR SALE

REAL ESTATE . . . 770 Lin. ft. Perdido Bay shore property in Baldwin County, Alabama, Gulf Coast, 18 mi. west of Pensacola, Fla. Access to potential barge drilling areas in protected bay waters or open Gulf. Also ideal site as barge line terminal or industrial plant. Address H. M. Tomkins, 1625 Barrancas Avenue, Warrington, Florida.

BUSINESS OPPORTUNITIES

FINANCIAL

WANTED: Man or Group that has ample capital to process and market a pigment deposit. Pigment, natural high grade industrial filler; Use—practically all industrial fields and products in which a filler is a part, ready market available. Qualified. Investigate.

WRITE

Chas. G. Nitz

212 N. 64th St., Milwaukee 13, Wisc.

WILDCAT COMPLETIONS

(Continued from page 164)

Leitner, SW SW 14-148n-71w. Dry. TD 5,182 ft.

CALIFORNIA

Kern County: Federal Oil Co. 1 Vedder, 20-27s-28e. Dry. Vedder 2,027 ft. TD 2,045 ft.

Kern Oil Co., Ltd., 63 Batz, 36-29s-29e. Dry. TD 4,970 ft.

Standard Oil Co. of Calif. 72-12 K.C.L.-35, 12-29s-26e. Dry. TD 4,200 ft.

Los Angeles County: Gene Reid Drlg., Inc., 81-13 General American, 13-5n-17w. Dry. TD 3,653 ft.

The Texas Co. 1 Long Beach Airport-2, NW NW 20-4s-12w, IPF 465 BOPD, 9 per cent cut, 18/64-in. choke, 31.8° gravity, perf. above 8,305 ft. TD 9,272 ft. (New fault-block oil pool ½ mile northeast of Long Beach field.)

Marin County: P. M. Oil & Gas Co. 1 P. M., 36-3n-9w. Dry. TD 1,670 ft.

Solano County: Humble Oil & Ref. Co. 1 Humble-Shell-Heringer, 9-6n-4e. Dry. TD 8,690 ft.

Tulare County: L. P. Reischman, Oper. 1 Henderson, 33-22s-27e. Dry. TD 691 ft.

Ventura County: Wm. Tomberlin 1 "Well," 12-3n-20w. Dry. TD 7,188 ft.

WYOMING

Big Horn County, Sage Creek: Sohio Petroleum 1 Hager, NW NE SE 18-57n-97w. Dry. TD 3,647 ft. Madison.

Carbon County, South Big Medicine Bow: McElroy Ranch, Natural Gas & Oil and Bruce Anderson 2 Horne, NE NE SW 11-20n-79w. IPF 50 BOPD, Muddy discovery, new field. TD 5,506 ft.

Converse County: J. A. McRae 1 Kornegay, C SE SE 29-31n-68w. Dry. TD 1,261 ft.

Roden & McRae Drilling Corp. and Midwest Oil Co. 1 State-Stalls, C SW SW 28-33n-76w. Dry. TD 5,888 ft. Dakota.

Natrona County, South Tisdale: O'Hanlon & Warren 1 TTT Ranch, C NW SW 10-40n-80w. Dry. TD 1,632 ft. in 3rd Frontier.

UTAH

San Pete County, Joes Valley: Three States 1 Steiner, NE NW SE 18-15s-6e. Dry. TD 3,805 ft. Star Point.

COLORADO

Adams County: Ginther, Warren & Ginther 1 UPRR Flader "A," NW NW NE 27-2s-59w. 2,2000 M.c.f. of gas per day, "J" sand. TD 6,313 ft.

Arapahoe County: Warren Petroleum Corp. 1 U. P. Lund, C NW SE 33-4s-62w. Dry. TD 7,476 ft. "J" sand.

Laramie County: British-American 1 Ihnen, C SE NE 31-5n-68w. Dry. TD 6,946 ft. Lyons.

LaPlata County, Blanco area: Carter Oil Co. 1 Ute, NE SW NE 23-32n-10w. Dry. TD 5,580 ft. Pt. Lookout.

Logan County: Braden & Hoover 1 McEdaffer, SE NE NW 25-10n-55w. Dry. TD 5,447 ft.

Cliff Somers 1 State, NW NE SW 19-8n-50w. Dry. TD 4,580 ft.

Morgan County: Tomberlin Petroleum, Inc., 1 Fagg, SW SW SE 31-6n-56w. Dry. TD 5,944 ft.

Denver Basin 1 Wagner, C SE SE 32-4n-56w. Dry. TD 5,452 ft.

S. D. Johnson and J. P. Sloss 1 Johnston, C SE SE 35-4n-60w. Dry. TD 6,307 ft.

Washington County: British-American 1 Porter, C SE NW 26-2s-56w. Dry. TD 5,126 ft.

Vaughey & Vaughey and J. J. Kladzuba 1 Barnes, SW SE NE 19-1s-56w. Dry. TD 5,463 ft.

Weld County: Paul Stock and Joe Juhan 1 Besondy, N ENE NW 10-8n-56w. Dry. TD 5,950 ft.

A. T. McDannald 1 Castor, NW NE NE 34-7n-59w. Dry. TD 6,653 ft.

Plains Exploration Co. 1 Bjolin, NE NE SE 33-7n-56w. Dry. TD 5,980 ft.

SASKATCHEWAN

Tide Water 13-22 North Dollard Crown, LSD 14, 22-8-20w3. Dry. TD 4,831 ft.

Tide Water 9-21 Forget Crown, LSD 9, 21-9-7w2. Dry. TD 4,300 ft.

Tide Water 1 Sanctuary Crown, LSD 16, 17-23-15w3. Dry. TD 2,692 ft.

ALBERTA

Huskey 2 Streamstown, LSD NE 4, 20-51-1w4. Dry. TD 2,000 ft.

Stanolind "A" 1 Montana, I.R., LSD 10, 22-43-24w4. Dry. TD 6,605 ft.

Amerada "AD" 7-19 Crown, LSD 7, 19-69-25w5. Dry. TD 11,133 ft.

International Briefs

(Continued from page 88)

Oil production, testing at a rate of 50 to 60 bbl. daily, has been discovered by the German company, Gewerkschaft Elwerath, in a wildcat, Wattenheim 1, about 5 miles north of Worms and 7 miles south of Stackstadt field in West Germany. The oil came from Pechelbronn formations at 7,750 ft.

The last section of a new pipeline system which will deliver products from the Barrancabermeja refinery in Colombia to Bogota is expected to be ready for service the latter part of August. This is a 90-mile, 8⅝-in. line from the refinery to Cantimplora for which Anderson Brothers is the contractor. The lines from Cantimplora to Salgar and from Salgar to Bogota were completed earlier. Another Colombian products line, 109 miles of 6 in., from Puerto Berrio to Medellin, is due to be completed soon.

The Indian Government is being urged to give high priority to oil exploration on its own account. A recent special conference of Indian State Governments at Srinagar to survey the country's mineral resources decided in favor of this step by the government. At present, Assam Oil Co., Ltd., has an extensive program under way in northeast India, while Standard-Vacuum Oil Co. is preparing to explore a large concession recently granted in the Bengal basin.

Iraq Petroleum Co., Ltd., has informed the Jordan Government it is willing to surrender the concession it holds in this Middle East kingdom, according to a report from Amman. The concession covering the entire country dates from May 10, 1947 and runs for 75 years.

Belgian interests are planning to attempt development of natural-gas production at Lake Kivu in the northeastern part of the Belgian Congo. An exploration company is to be organized for the purpose. The president of Cie. des Chemins de Fer du Congo Superieur aux Grand Lacs Africains said recently in Brussels that his company would contribute to the capital of the new venture.

The Peruvian Government has granted Robert G. Le Tourneau an oil exploration concession covering 115,394 hectares, or about 285,000 acres, in the trans-Andean Montana. Le Tour-

neau is a United States businessman who is working on a Peruvian colonization and reclamation program embracing about 1,000,000 acres of jungle territory. The area covered by the oil concession is located in the same region. Other oil concessions near the area are held by Peruvian Oil & Minerals, Ltd., and Cia. Peruana de Petroleo, El Oriente, S.A.

The Greek Government has decided to carry out its long-discussed refinery project on its own. A government announcement in Athens said the government would build the plant and during construction negotiate with private interests for its operation. Last year, the government invited offers for the construction of a refinery in Greece, offering a loan for half the cost. Several proposals were made but the government apparently was unwilling to give the guarantees asked.

The French oil company, Soc. des Petroles d'Acquitaine, has been granted an exploration permit by the French Government in the departments Meurthe-et-Moselle, Meuse, and Vosges in eastern France.

The organization of a company to acquire tankers for the movement of oil to and from Egypt is being discussed by the Egyptian Government with French and Saudi Arabian financial interests. After meeting with French bankers recently visiting in Cairo, Dr. Hassan Marey, Egyptian minister of commerce, said a company to buy tankers and having capital of £1,300,000 ($3,750,000) is under consideration.

Natural-gas production has been tested in the Roma area in southern Queensland. Associated Australian Oilfields, Ltd., which has been exploring in the area, said gas flowed at a rate of 1,500,000 cu. ft. daily from the well. Exploration has been carried on in the Roma area for many years with negligible results.

A new company, Mitsubishi-Shell Petroleum Co., has been organized in Japan by Anglo-Saxon Petroleum Co., Ltd. (Royal Dutch-Shell) and Mitsubishi Chemical Co. It will produce 3,000 tons of acetone and 2,000 tons of isopropyl alcohol.

LEGAL

Sealed bids for Oil and Gas Mining Leases on restricted Tribal and Allotted Lands of the Fort Berthold Indian Reservation, North Dakota will be received at the Office of the Superintendent of the said reservation, New Town, North Dakota, until 2:00 P. M. Central Standard Time on July 27, 1954, and will be opened immediately thereafter in the presence of such bidders as may attend. There are 675.28 acres of Tribal lands and 14,933.34 acres of Allotted lands for a grand total of 15,668.62 acres. All of this land is located in McLean county, State of North Dakota. For additional information write the superintendent of the Fort Berthold Agency, New Town, North Dakota, or call the Agency Land Office, phone 74340, New Town, Ralph M. Shane, Superintendent.

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LEGAL

Sealed bids will be received at the Jicarilla Indian Agency Office, Dulce, New Mexico, until 3:00 o'clock, P. M. (MST), July 28, 1954, and then publicly opened for sale of oil and gas leases on 39 tracts of Jicarilla Tribal Indian lands, totaling 62,248 acres, more or less, located in Rio Arriba and Sandoval Counties of New Mexico on the Jicarilla Indian Reservation. Each tract, containing one to four sections each, is offered for lease separately. Complete description of the land, location, provisions, and stipulations of the leases to be sold, may be obtained from the Superintendent, Jicarilla Indian Agency, Bureau of Indian Affairs, Dulce, New Mexico, upon request.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington, D. C. Notice is hereby given that the SE¼ SE¼ sec. 4, T. 20 N., R. 3 W., Michigan Meridian, containing 40 acres, within the known geologic structure of Headquarters Field, undefined, in Clare County, Michigan, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1:00 p.m., E.S.T., on August 11, 1954, when bids will be opened. Details of the lease offering, how and where to submit bids, and bid forms may be obtained from the Director, Bureau of Land Management, Washington 25, D. C. L. E. Hoffman, Chief, Division of Minerals.

"Holding Power" is an interesting new industrial film which tells the complete story of fasteners. It describes common, everyday fastener items, such as bolts, nuts, rivets, track bolts and spikes, and shows how important they are to our modern way of life. The film also includes roof bolts, high-strength bolts, oil-well sucker rods, and a wide range of ingeniously designed special bolts.

"Holding Power" is in color, with sound. It is on 16 mm film, and runs about 25 minutes.

The film is intended not only for those closely associated with the fastener field, but also for general-type audiences. There is no charge for this educational picture, except for return postage. If you would like to use a print, write fully to Room 1041, Publications Department, Bethlehem Steel Company, Bethlehem, Pa., preferably well in advance of your showing date.

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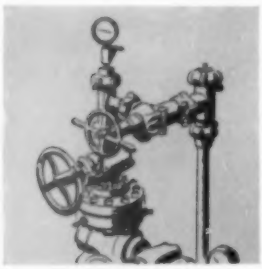

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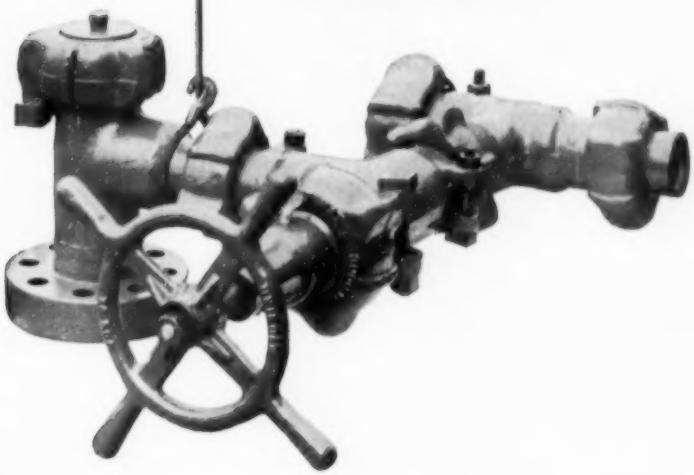

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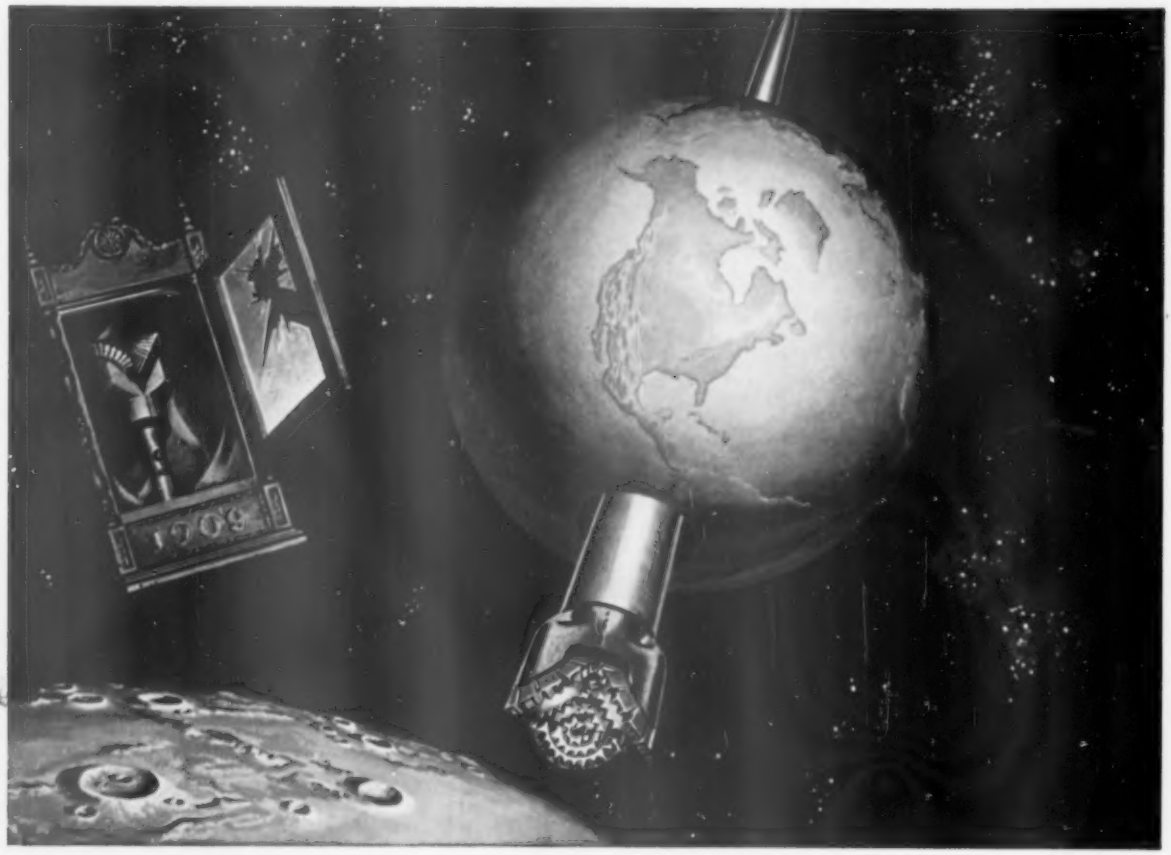

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